United States
Department of
Agriculture

FOREST SERVICE

NORTHERN REGION

JUNE, 1991

WEST MOYIE

FINAL ENVIRONMENTAL IMPACT STATEMENT

IDAHO PANHANDLE NATIONAL FORESTS

BONNERS FERRY RANGER DISTRICT

WEST MOYIE
FINAL ENVIRONMENTAL IMPACT STATEMENT

Idaho Panhandle National Forests
Bonners Ferry Ranger District
Boundary County, Idaho

JUNE, 1991

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ABSTRACT

The Bonners Ferry Ranger District has developed eleven alternative proposals to harvest timber and construct roads in the West Moyie Decision Area. The proposed activities within the 20,673 acre Decision Area have three objectives:

1. to provide the amount of timber that this area can supply for area lumber mills,
2. to reduce the risk of insect and disease mortality and provide for long-term increased sustained yield of wood products of desired species and size,
3. to maintain big game winter range habitat for this area.

Alternatives were developed to respond to the major issues identified during the environmental analysis. Alternative A would result in no timber harvest or road construction at this time. Alternative B2 would provide a significant amount of timber for area lumber mills. Alternative D would provide a greater degree of visual quality protection than the visual quality objectives adopted through the Forest Planning process. Alternative E would only harvest timber accessible from existing roads and would not enter the roadless area. Alternative EH was developed from a proposal presented by a group of Moyie River area residents in response to the Draft EIS. Alternative H (The Initial Proposed Action) would harvest an acreage level near the Forest Plan predictions for the Decision Area. Alternative I would provide a high quality white-tailed deer winter range habitat condition in areas where the primary Forest Plan land use allocation was for timber production. Alternatives J1, J2, and J2H (identified as the Agency Preferred Alternatives in the Draft IES) were developed to meet the objectives provided by the public through a series of meetings. One alternative could not be developed to meet all of these objectives. Alternatives J1, J2, and J2H demonstrate the trade-offs made between the objectives in trying to meet as many objectives as possible within one public working group alternative. Alternative K, the Preferred Alternative, was designed during Final EIS development in recognition of the public responses to the Draft and agency concerns identified during further analysis by the ID Team.

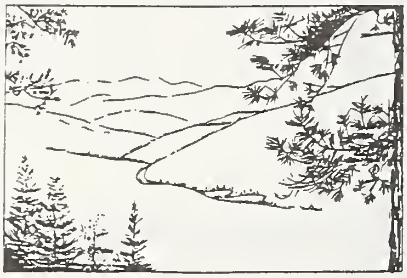
User's Guide to the West Moyie Final Environmental Impact Statement

"How to Find Your Way Through this Document"

One primary purpose of an Environmental Impact Statement (EIS) is full and fair discussion of significant environmental impacts. Both agency decision-makers and the public are provided with a range of reasonable alternatives to a proposed action. This process insures the policies and goals of the National Enviromental Policy Act (NEPA) become part of the ongoing programs of Federal agencies.

This Final EIS contains a Summary, five Chapters, and five Appendices. You do not need to read it from cover-to-cover to understand it or to draw your conclusions from the discussion and analysis. Your individual concerns and interests will guide you through the document.

It is not necessary to read Chapter One first followed by Chapter Two, Three, and so on. You can start in the section which reponds to your major concern. Go into as much detail as you feel is desirable to help clarify issues or alternatives.



The Summary outlines the major conclusions reached through environmental analyses. It highlights the concerns raised by the public and government agencies and the issues to be resolved within the Decision Area. The choices among the range of alternatives are summarized to aid you in comparison of their effects.

Chapter One discusses the purpose and need for activity in the West Moyie area. It will help you understand why the Forest Service is proposing the management alternatives. It identifies the location of the project area and the major resources that were considered. The relationship between this Final EIS and the Forest Plan for the Idaho Panhandle National Forests is explained.

Chapter Two is the heart of the EIS. It presents the environmental impacts of the alternatives in comparative form. This helps to sharply define the issues and provide a basis for choice among the options. Alternatives which were eliminated from further study and the reasons for that decision are briefly discussed. Forest-level and site-specific project monitoring are outlined.

Chapter Three describes the environment that will be affected by the alternatives under consideration. This section will give you a feeling for the current biological and physical condition of the area. It also provides the background understanding of the Forest Plan management direction, standards and goals.

Chapter Four forms the scientific and analytical basis for the comparison of alternatives. It shows you what would happen to the resources if a particular alternative is implemented. Discussion includes both direct and indirect effects of actions and their significance. Unavoidable adverse environmental effects and any irreversible and irretrievable commitments of resources are disclosed.

Chapter Five covers the public scoping process used in development of the Draft EIS and the responses received from the public after release of the Draft EIS. It summarizes the public involvement between the Draft and Final EIS. It also contains copies of all letters from everyone who commented on the Draft EIS. Following each letter is our answer to the respondent's concern and information directing you to the page(s) of the Final EIS where the particular concern is addressed.

The Appendices contain material which supports and/or explains analysis within the EIS. It is background information which will help further your understanding of the environmental impacts of the alternatives.

To follow a Resource Issue:

The Table of Contents lists the location of each Resource Issue within the chapters and appendices of the EIS. This would be a good starting point if your greatest concern is with a particular aspect of the environment. More specific references are pinpointed thru the Index of Subject Matter.

To gain familiarity with the existing condition of the resource within the Decision Area, read the appropriate section in Chapter 3, Affected Environment. For comparison of the effects each alternative would have upon the resource read Chapter 4, Environmental Consequences. A summarized comparison of all alternatives can be found in Chapter 2.

To Compare Alternatives:

For the reader who has knowledge of the area and the resources, it may be beneficial to start with Chapter 4, Environmental Consequences. The effects of each alternative are explained in greater detail than in the Chapter 2 summaries and comparisons. Alternatives which were considered but dropped from further study are summarized in Chapter 2.

"Do it Your Way"

There is no "Right" or "Wrong" way to approach this document. Your individual interest and concerns should be your key to getting the most from it. Read it in the order which makes it most understandable for you and answers your questions.

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SUMMARY

INTRODUCTION

This Final Environmental Impact Statement (FEIS) describes timber harvest activities on 45 site specific units totalling 1,695 acres in the West Moyie area of the Bonners Ferry Ranger District on the Idaho Panhandle National Forests. The entire Decision Area is 20,673 acres, with approximately 18,626 acres of National Forest Land. The map on the following page displays the location of the Decision Area.

Ten alternatives for harvesting timber and a "no action" alternative have been evaluated. Alternatives J1, J2, and J2H represent a range of alternatives that were developed to meet objectives provided by the public through a series of meetings. These alternatives were identified as the preferred agency direction in the Draft EIS. During preparation of the Final EIS, Alternatives EH and K were developed in response to public comments on the Draft EIS.

In this summary the purpose of the proposal is identified, as are the alternatives developed to address the issues. A comparison of the alternatives discloses the important effects of the proposed action.

Copies of this Final EIS are available from the Bonners Ferry Ranger District, South Highway 95, Bonners Ferry, ID 83805. The West Moyie Final EIS project files are available for viewing at the Bonners Ferry Ranger District Office in Bonners Ferry, Idaho. Copies of this Final EIS will be available in the public libraries in Bonners Ferry, Sandpoint, and Hayden Idaho; and Troy and Libby Montana. Copies will be available for review at each of the Idaho Panhandle National Forests Ranger District offices. Copies will be available for review at the Three Rivers Ranger District office in Troy, Montana, and the Kootenai National Forest, Forest Supervisor's Office in Libby, Montana.

PURPOSE AND NEED

This Final EIS was written in compliance with NEPA (the National Environmental Policy Act) and was prepared to disclose the effects of the proposed timber harvesting.

The purpose of the proposed timber harvest and road construction activities addresses the following needs:

1. To provide the amount of timber that this area can supply for area lumber mills.

2. To reduce the risk of insect and disease mortality and provide for long-term increased sustained yield of wood products of desired species and size.

3. Maintain big game winter range habitat for this area.

ISSUES

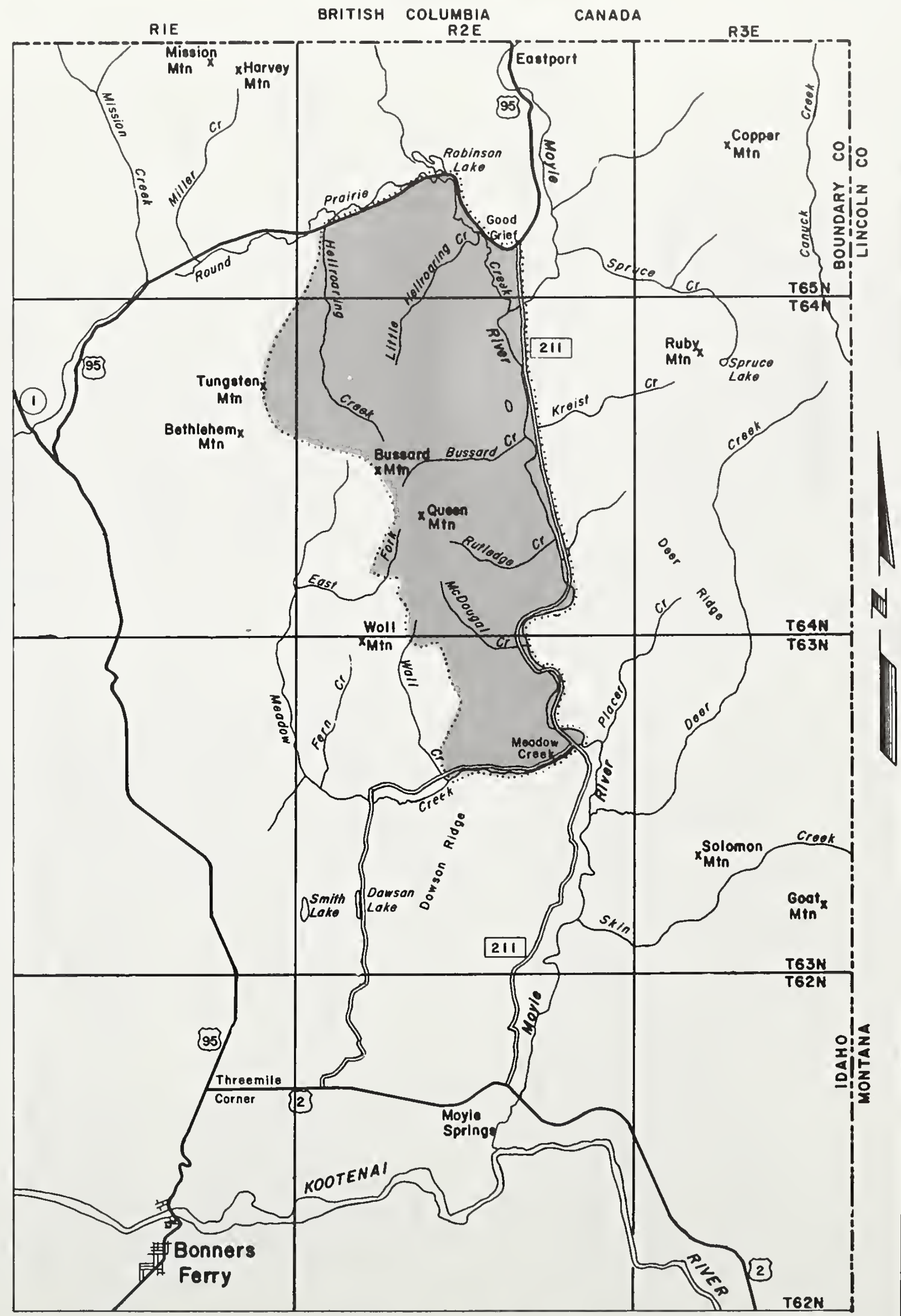
Bonners Ferry Ranger District personnel began identifying the issues to be considered in this Final EIS during the winter and early spring of 1989. A Notice of Intent to prepare an Environmental Impact Statement was published in the Federal Register in March, 1989. A post-scoping document was prepared and sent in July of 1989 to all individuals who had shown interest in this project. This document included:

1. An explanation of issues identified through public involvement and internal scoping.

2. Indicators proposed to measure the effects of the proposed action and alternatives on the issues, and

3. Alternative descriptions as designed in response to the issues.

Several meetings with interested groups and organizations were held in conjunction with the comment period of the post scoping process.



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BONNERS FERRY RANGER DISTRICT

Figure S-1

EIS VICINITY MAP

The following issues are a result of that scoping process, and serve to direct the formulation and evaluation of the alternatives.

1. Roadless Character: Hellroaring Roadless Area No. 1-128 is within the Decision Area. As identified in the IPNF Forest Plan EIS - Appendix C, the Roadless Area contains 11,700 acres. Due to timber management activities that occured after the Forest Plan roadless area analysis, this roadless area currently contains 8,800 acres suitable for roadless classification.

2. Water Quality: This issue comes from the recognition of the importance of water quality to all beneficial uses downstream, including fisheries, recreation, and human consumption. The Beeline Water Association's source for their public water system is partially within the Decision Area. The State of Idaho and the IPNF have identified several fishery streams within the area. This issue deals with the effect of management practices on water quality.

3. Visual Quality: This issue addresses the concern over visual disturbance from land management activities. Included in this issue is the concern about silvicultural methods used and their effect on the visual resource. Residents within and adjacent to the Decision Area have identified visual disturbance or changes in the scenery as one of their primary concerns.

4. Wildlife: This issue reflects the concern for big game species and species of wildlife related to mature and old growth vegetation. It deals with the effect of timber harvesting and road construction on wildlife habitat needs. Included is the concern with the management of threatened and endangered and sensitive species.

5. Vegetation: The Forest Plan designates a timber management prescription for the major portion of the Decision Area. This issue deals with the ability to obtain a sustained yield of timber for industry and the need to control mortality and develop a balanced age class distribution.

AFFECTED ENVIRONMENT

The Decision Area is located within the Idaho Panhandle National Forests, Bonners Ferry Ranger District. It is located in the northeast corner of the State of Idaho, approximately three miles south of the international border with Canada and six miles west of the Idaho/Montana state line.

The area's climate is typical for Northern Idaho and reflects a strong maritime influence of occasional heavy rains or snowfall. Seventy percent of the precipitation is received between October and April. Summers are fairly dry, but frequent local thunderstorms can occur over the area. Tree and shrub growth is good and the area is highly productive for timber.

Elevations range from 2400 feet to 6200 feet. The topography of the Decision Area is typical for glaciated landscapes, with wide valleys, steep midslopes, and rounded, gentle ridges. The Moyie River runs through the valley bottom on the east side of the Decision Area. The majority of the valley bottom land is in private ownership, and private land owners control most access to the Moyie River.

Most wildlife species found in Idaho are also found within the Decision Area. Elk, moose, black bear, and white-tailed and mule deer inhabit the area, as do many other mammals and birds.

A tree covered landscape interspersed with rock outcrops is dominant in the center undeveloped portion of the Decision Area. The northern one-third of the Decision Area has been developed and contains clearcut and seedtree harvested units that are visible from Highway 95, the Moyie River, and Meadow Creek Road. The southern one-third of the Decision Area is also developed with roads and harvesting units.

Nearly all of the timber stands within the Decision Area were established following large forest fires, in the late 1800's or early 1900's. These timber stands can be best described as mixed conifer. With the exception of some large stands of nearly pure lodgepole pine, timber stands here have a good diversity of species, a common characteristic of North Idaho forests.

The Decision Area represents four percent of the entire Moyie River drainage area above Meadow Creek which is at the southern edge of the Decision Area. There are several streams flowing from the Decision Area into the Moyie River. Beneficial downstream water use includes: domestic water supply; agricultural water supply; cold water biota; salmonid spawning; recreation; and hydro power generation.

Recreation use is primarily hunting; hiking and trailriding, both horseback and motorcycle, on the trail system; fuelwood gathering; camping; berry picking; and driving for pleasure. Two developed campgrounds are located adjacent to the Decision Area. Meadow Creek campground is located along the Moyie River to the south, and Robinson Lake campground is just north of Highway 95 to the north.

< < < < ALTERNATIVES > > > >

Changes Between the Draft and Final EIS

In response to public comments received after release of the Draft EIS, two additional action alternatives were developed and analyzed. Alternative EH (named for using Alternative E as a base and adding the helicopter logging as well as some other harvest units) was proposed by a group of Moyie River area residents. Alternative K was developed by the ID Team to address similar public issues as well as agency concerns identified during further analysis by the ID Team. It varies from EH in the management options it uses to reach these objectives.

INTRODUCTION

The alternatives were developed by an interdisciplinary team (ID Team). Preliminary alternatives were developed during the scoping process to address issues developed early in the public involvement process. These alternatives were made available to the public through the post-scoping public involvement process. The ID Team, considering all public input, and IPNF Forest Plan management direction, finalized these alternatives and developed three additional alternatives in response to input from individuals who chose to become involved in the alternative development process. As stated earlier, two additional alternatives were designed and analyzed after the Draft EIS was released. Each alternative was developed to address one or more issues.

Alternatives J1, J2, and J2H represent a range of alternatives, which were discussed in the Draft EIS as being suitable as agency preferred alternatives. They represent a range of viewpoints that were expressed by those citizens who chose to become very involved throughout the analysis process. This group was able to identify a number of common objectives which, if met in a single alternative, they felt would represent a very good proposal that they could all support. The ID Team was not able to create this single alternative but did develop three alternatives (J1, J2, J2H) that vary slightly from each other. The alternatives demonstrate the effects and trade-offs in meeting as many of the group's common objectives as possible. The alternatives' variations place emphasis on objectives that could not be fully met in a single alternative.

Alternative A - No Action

This "No Action" alternative, or more correctly, "No Action at This Time" alternative provides a baseline to compare the effects of the actions of all other alternatives (called "Action" Alternatives). This alternative provides for the completion of existing timber sale contracts previously awarded within the Decision Area.

Alternative B2

In response to the dependance of Boundary County to the supply of National Forest timber, this

alternative was designed to assess the trade-offs between providing a significant amount of timber and other resources. It demonstrates the impacts to roadless values, wildlife, water quality, and visual quality that would be necessary to achieve this level of timber harvest using conventional harvesting techniques. It would not meet Forest Plan adopted Visual Quality Objectives, water quality standards, and some wildlife objectives.

Alternative D

This alternative was designed to assess the trade-offs involved in providing a greater degree of visual quality protection compared to the visual quality impacts of the initial proposed action. It provides a level of visual quality well within the Visual Quality Objective thresholds of the Forest Plan.

Alternative E

This alternative was designed to define the trade-offs between the proposed action and the retention of existing roadless character and increased water quality protection. This alternative contains no road construction. It would harvest only the timber accessible with the existing road network. In addition it would not harvest any timber within the roadless area, even where there is access immediately adjacent to the roadless area.

Alternative EH

Alternative EH was proposed by a group of local residents. It was designed to provide a compromise between the impacts of additional road construction in the area and the need to provide a reasonable amount of timber for local industry and the need to reduce long-term risks from insect and disease. It is a combination of Alternative E, plus the helicopter option described in Alternative J2H, and adding to the helicopter option all those stands from Alternative J1 which are at high risk and all stands with proposed harvest methods that leave at least 50 percent of the existing trees.

Alternative H

This alternative is the initial proposed action. It was developed to provide a timber harvest acreage near Forest Plan predicted levels. Timber harvest units identified through the Forest Plan ground truthing process were modified to meet a higher degree of visual quality and to reduce potential impacts to recreation facilities.

Alternative I

This alternative was designed to assess the trade-offs involved in providing a higher quality white-tailed deer winter range compared to the winter range impacts of the initial proposed action. It exposes the trade-offs in sell volume necessary to provide winter range habitat in an area with a management prescription that emphasizes timber production.

Alternatives J1, J2, and J2H

These alternatives were designed to meet the objectives developed at public meetings during the Draft EIS preparation. These objectives include:

1. Limit clearcutting to high risk stands where it is the only valid option.

2. Manage the area below 3,000 feet in elevation for white-tailed deer winter range.

3. Utilize shelterwoods where possible, keep a portion of the overstory for an extended period of time to improve visual quality in sensitive areas.

4. Reduce road construction, skid longer distances where it will fit with transportation systems.

5. Provide for 10 percent old growth (existing plus recruitment stands), by Old Growth Management Unit.

6. Roads
    a. Close new roads with barriers following completion of post sale activities.

    b. Maintain existing open road system to provide for roaded recreation opportunities.

    c. Explore options to handle dust problem on Meadow Creek Road.

    d. Seed roads to be closed, skid trails, and landings following completion of use.

7. Meet Forest Plan volume predictions for the Decision Area (17.2 Million Board Feet).

8. Enhance recreation opportunities.

9. Water Quality; consult with the Beeline Water Association.

The ID Team determined that it was not possible to meet all these objectives with one alternative. Therefore the following three alternatives were developed to demonstrate the trade-offs necessary to meet each objective.

Alternative J1

This alternative was developed to demonstrate the trade-off of timber volume necessary to meet all the other objectives. This alternative did not meet Forest Plan harvest predictions for the Decision Area. The need to maintain thermal cover within the winter range area and limiting clearcutting to high risk lodgepole pine stands where it was the only valid option resulted in a reduction of harvest acres as compared to Forest Plan predictions.

Alternative J2

This alternative was developed to assess the trade-off between meeting Forest Plan harvest acreage predictions and objectives 1, 2, and 8 above. Clearcutting was planned in stands where it was the only valid option, but the stands were not at high risk. It also would provide less cover in the winter range area and larger size harvest openings than desirable for white-tailed deer. In addition, it would impact the trail system to a higher degree than Alternative J1. The Forest Plan harvest acreage predictions would be met with this alternative, but it would still harvest less timber volume than predicted by the Forest Plan ground truthing.

Alternative J2H

This alternative was developed to assess the trade-offs necessary between the objective to meet the Forest Plan volume predictions for this area and other objectives provided by the public. It is identical to Alternative J2 with the exception of 1,206 acres of helicopter harvesting that has been added. This helicopter harvesting is a stand tending operation - salvaging timber that otherwise would be lost and basal area thinning to reduce the lodgepole pine susceptibility to mountain pine beetle infestation. This helicopter option was added to alternative J2 to demonstrate the cumulative effects of the helicopter harvesting option when added to another alternative. The difference in effects between alternative J2 and J2H are due entirely to the helicopter option. This helicopter option could be added to any of the action alternatives considered.

Alternative K - the preferred alternative

This alternative was designed in response to public comments received after release of the Draft EIS and agency concerns identified during further analysis between the Draft and Final EIS. It focuses on these objectives:
1. Visual Quality meeting or above the VQOs.
2. Water Quality
3. Timber volume near the Forest Plan ground truthing level.
4. Reducing the risk of timber loss from insect/disease mortality.
5. Focusing silvicultural treatments on those that will benefit big game winter range, boreal owl, and goshawk within each species habitat areas.

COMPARISON OF ALTERNATIVES

ALTERNATIVES

	A	B2	D	E	EH	H	I	J1	J2	J2H	K
ROADLESS											
Area Remaining (acres)	8800	2600	5600	8800	2050	3100	3400	4300	3100	0	2130
Wilderness Option Retained	Yes	No	Yes	Yes	No	No	No	No	No	No	No
WATER QUALITY											
Peak Water Yield Increase Percent Over Base											
Hellroaring Creek- Peak 1995	5	8	5	6	6	6	6	6	6	6	6
Little Hellr Cr - Peak 1995	6	7	6	7	7	7	7	8	8	8	7
Bussard Lake - Peak 1994	2	6	3	2	4	3	3	3	3	4	4
Bussard Creek - Peak 1995	0	2	0	0	1	0	0	0	0	1	1
Snyder - Peak 1993	0	4	1	0	5	2	1	1	2	5	3
Upper Meadow Cr - Peak 1996	1	2	1	1	1	2	2	1	2	2	2
Rutledge Creek - Peak 1993	3	4	3	3	4	4	3	3	4	4	4
Rutledge Cr Trail- Peak 1993	0	4	1	0	5	3	2	2	2	6	6
McDougal Creek - Peak 1996	3	4	3	4	4	4	4	5	5	5	4
Meadow Cr Tributaries - Peak 1996	1	2	1	1	1	1	1	1	1	1	1

The percent increase in peak flow that a watershed can safely accept is dependant on the stability of its channels. All drainages within the Decision Area, with the exception of Hellroaring Creek, have stream channels that can sustain increases between 15 and 20 percent without damaging the channel. The stream channel stability in lower Hellroaring Creek is poor and can only sustain increases of less than 8 percent.

	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Peak Sediment Yield Increase Percent Over Base											
Upper Meadow Cr - Peak 1996	8	25	8	8	8	25	16	8	16	16	25

Upper Meadow Creek supplies water for the Beeline Water Association public water supply system. 25% sediment yield increase over base rates is the maximum sediment yield for this drainage that would meet proposed State of Idaho turbidity standards for public water supply systems.

	A	B2	D	E	EH	H	I	J1	J2	J2H	K
VISUAL QUALITY											
Visual Condition Class Acres											
Untouched *	8571	0	5015	8571	0	0	0	6934	5579	0	0
Unnoticed	950	1496	1919	623	4683	5016	6248	623	623	3546	4373
Minor Disturbance	1265	1265	3852	1265	1265	1265	3608	2867	1592	1265	2415
Disturbed	1665	2545	1665	1992	6363	6120	2545	1887	4517	7500	5523
Major Disturbance	6175	13320	6175	6175	6315	6225	6225	6315	6315	6315	0
Drastic Disturbance	0	0	0	0	0	0	0	0	0	0	0

Visual Condition assessments estimate the on-the-ground visual resource condition and are expressed as acres of Visual Condition Class. They are a comparison of the level of landscape disturbance that would be noticed by a visitor to the area.

* Untouched areas less than 5000 acres in size are reported as Unnoticed area.

	A	B2	D	E	EH	H	I	J1	J2	J2H	K
HARVEST METHOD											
Clearcut Acres	0	640	0	0	0	125	85	0	75	75	0
Seed Tree Acres	0	530	0	105	160	325	280	300	325	325	140

COMPARISON OF ALTERNATIVES continued

	A	B2	D	E	EH	H	I	J1	J2	J2H	K
WILDLIFE											
ELK											
Elk Habitat % of Pot.	56	49	51	52	48	50	59	51	51	46	47
WHITE-TAILED DEER											
Cover/Opening Ratio	71/29	55/45	65/35	65/35	60/40	62/38	69/31	65/35	62/38	56/44	65/35
Ave. Unit Size-Acres	N/A	28	21	20	21	21	5	19	21	23	17

Elk habitat is the indicator for summer range condition for all big game species and the indicator to demonstrate security habitat for Threatened and Endangered and Sensitive species. White-tailed deer cover/opening ratio and average unit size is the indicator for the condition of winter range habitat for all big game species. A cover/opening ratio between 60/40 to 80/20 and an average unit size of ten acres is preferred. All harvest units within suitable winter range areas are included in these figures regardless of Forest Plan land use allocations.

	A	B2	D	E	EH	H	I	J1	J2	J2H	K
VEGETATION											
Total Volume Harvested	0	21.1	7.9	5.8	15.7	11.8	7.2	11.2	12.9	19.3	15.9
High Risk Timber Harvested											
Acres	0	681	675	413	1816	635	471	741	790	1996	1476
% of Total Hi Risk Acres	0	20	20	12	53	18	14	21	23	58	43
MMBF Volume	0	8.2	5.8	3.6	12.1	6.3	4.4	7.2	7.9	13.8	12.3
% of Total Volume	0	39	73	62	77	53	61	64	61	72	77

CHAPTER 1 PURPOSE AND NEED

U.S.D.A. FOREST SERICE
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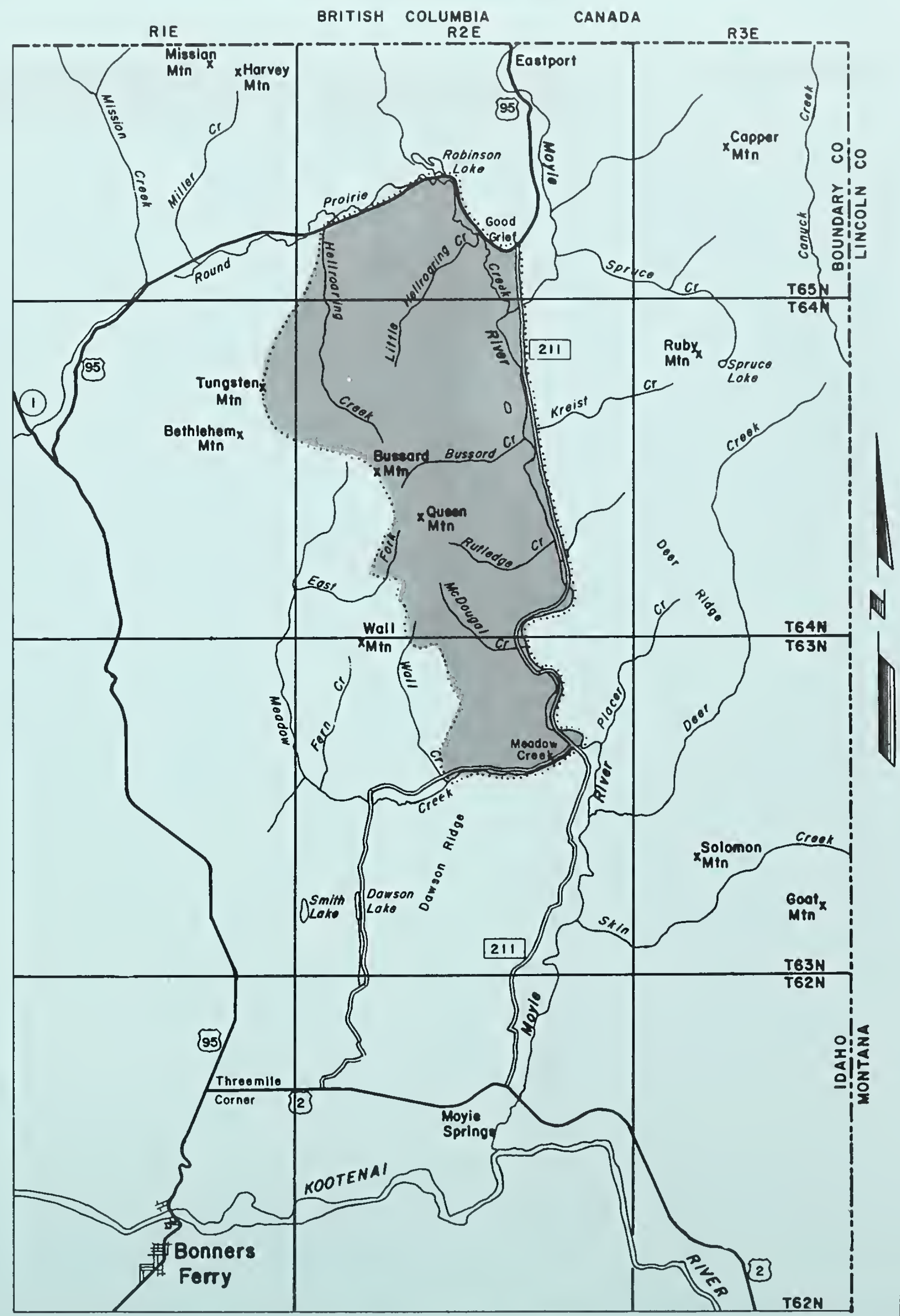


Figure 1-1

EIS VICINITY MAP

PROPOSED ACTION

The Forest Service proposes to harvest timber and construct roads in the West Moyie Decision Area. The proposed action is to harvest timber on 1,695 acres, to control fuel accumulations to desired levels, to construct 12 miles of road, and to reconstruct 9 miles of road. Of the 1,695 acres of harvesting, 755 would require reforestation, the remaining 900 acres would be intermediate harvesting comprised of thinning and sanitation salvage harvesting. The proposed action is represented by Alternative H in Chapter 2.

This initial proposed action was the foundation for scoping and preliminary analysis of potential environmental consequences. Based on scoping and the preliminary analysis, the (interdisciplinary) ID Team developed alternatives as discussed in Chapter 2. Additional public involvement and environmental analysis resulted in the identification of alternatives which were identified as the agencey preferred alternatives when the Draft EIS was released. During development of this Final EIS, Alternatives EH and K were developed. Alternative EH was presented by a group of Moyie River area residents in response the the Draft EIS. Alternative K was designed by the ID Team in recognition of other public comments to the Draft EIS.

This Decision Area is located within the Idaho Panhandle National Forests, (IPNF), Bonners Ferry Ranger District. It is approximately 12 air miles northeast of the community of Bonners Ferry, Idaho.

Drainages within the area include: Hellroaring Creek, Little Hellroaring Creek, Bussard Creek, Rutledge Creek, McDougal Creek, and portions of Round Prairie Creek, Meadow Creek, and the East Fork of Meadow Creek. All drainages drain into the Moyie River, which is included within the east side of the area. Lands included in the Decision Area are located to the west of the Moyie River, south of Highway 95, and north of Meadow Creek; Queen Mountain/Tungsten Mountain range forms the west boundary.

There are approximately 20,673 acres within the Decision Area, with approximately 18,626 acres of National Forest Land. Included within the area are all or portions of the following: Sections 2-4, 9-11, and 14-16, T63N, R2E; Sections 2-11, 14-18, 20-23, 26-29, and 32-35, T64N, R2E; Sections 1, 12, and 13, T64N, R1E; and Sections 21 and 27-35, T65N, R2E, BM, Boundary County, State of Idaho.

The Hellroaring Roadless Area (number 01128) is entirely within this area (currently inventoried at 8,800 acres).

PURPOSE AND NEED

The purpose of the proposed timber harvesting and associated road building is to:

(a) provide the amount of timber that this area can supply for area lumber mills

(b) reduce the risk of insect and disease mortality and provide for long-term increased sustained yield of wood products of desired species and size, and

(c) improve big game winter range habitat within the area.

Forest Service timber production plays a significant role in maintaining community stability in Boundary County. Approximately 21 percent of the labor force in Boundary County is employed by the timber industry, with local mills dependent on Forest Service timber for 70-75 percent of their raw material (Forest Plan EIS, II-111).

Improving the sustained yield is dependent on controlling losses to fire, insects, and disease; and developing a balanced age class distribution. Mountain pine beetles are present within the area at endemic levels. Reconnaissance of lodgepole pine stands revealed that small groups of trees are being attacked by the beetles and that mortality is starting to occur. Root rot is present in Douglas-fir stands. Mortality from this disease has been identified during field reconnaissance.

Timber harvesting will provide for the industrial use of damaged and high risk timber before it loses commercial value. Timber management will create a mosaic of tree species and age classes that is less susceptible to future Mountain pine beetle infestations and root rot infections.

Post-sale site preparation can also reduce undesirable fuel accumulations.

Big game winter range exists in the lower elevations, generally below 3,000 feet. The quality and distribution of forage is at less than desirable levels; but it is not the factor most limiting to use of the winter range. Further analysis during preparation of the Final EIS has shown that cover limits the amount of available forage on the winter range. There are methods of timber harvesting which will improve the cover/forage ratio and broadcast burning can provide the opportunity to improve the quality and distribution of winter range forage.

SCOPE OF THE EIS

The scope of this EIS was determined in accordance with the requirements of 40 CFR 1508.25. The regulation requires that this EIS consider three types of actions, three types of alternatives, and three types of impacts. Through public scoping (40 CFR 1507.1(a) (2)) and agency analysis the scope of this EIS was determined as follows:

ACTIONS

According to 40 CFR 1508.25 agencies must consider three types of actions when determining the scope of an EIS: connected actions; cumulative actions; and similar actions.

Connected Actions

Connected actions are those that automatically trigger other actions which cannot proceed unless other actions are taken previously or simultaneously. In addition, connected actions are those representing interdependent parts of a larger action and depend on the larger action for their justification.

Cumulative Actions

Cumulative actions are those that may combine with other proposed actions to cause cumulatively significant impacts.

Similar Actions

Similar actions are those that, when viewed with other reasonably foreseeable or proposed actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.

In determining the scope of this EIS, the ID team reviewed these regulations. As a result, the ID team determined that it is appropriate to consider together in this EIS all of the proposed timber harvesting and road construction expected to occur in the geographic area during the next five years. In addition, this analysis takes into account related activities such as site preparation and timber regeneration actions. The ID team did not identify any other proposed actions that meet the criteria of 40 CFR 1508.25(a).

ALTERNATIVES

The agency must consider three types of alternatives (40 CFR 1508.25(b)) - the no action alternative; other reasonable courses of actions; and mitigation measures not included in the proposed action (Alternative H). Chapter 2 includes the description of the No Action Alternative A, the proposed action as Alternative H, and other reasonable courses of action that would wholly or partially satisfy the purpose and need. In addition, mitigation measures are discussed in the specific description for each alternative and the Features Common to All Alternatives in Chapter 2.

IMPACTS

The agency is required to consider three types of impacts - direct, indirect and cumulative (40 CFR 1508.25(c)). The direct and indirect effects of the proposed action (Alternative H) and other alternatives are discussed in detail for each significant issue in Chapter 4. In addition, for each significant issue, potential cumulative impacts of reasonably foreseeable or similar actions are disclosed.

The agency determined cumulative impacts, based on the definition as stated in 40 CFR 1508.7, and considered the incremental impact of the initial proposed action (Alternative H) when added to

other past, present, and reasonably foreseeable future actions. The No Action Alternative A documents the effects of other past and present actions.

Reasonably foreseeable future actions considered include:

(a) Gas pipeline construction: Pacific Gas Transmission Co. has proposed to construct a gas pipeline adjacent to their existing pipeline through the east side of the Decision Area. This action is proposed for 1992 to 1994.

(b) Future timber sales are being considered on National Forest lands surrounding the Decision Area. Specific sale locations were identified by the ID Team, and documented in the project file.

Other reasonably foreseeable future actions within the Decision Area include:

- Low scale mining activity, mostly within T64N, R2E, B.M.
- Development and logging on private lands along the Moyie River
- Overstory removal on existing regeneration harvested units
- Salvage harvesting within the roaded portion of the Decision Area
- Fuelwood gathering within the roaded portion of the Decision Area
- Commercially thinning sapling and pole size timber in the vicinity of Twin Bridges. Material would be commercially removed for tree stakes. Approximately 15 to 20 acres per year could be thinned for the next five years.

Planning for activities on the National Forest System involves two levels of decisions:

The first level is the development of a Forest Plan that provides direction for all resource management programs, practices, uses, and protection measures. The Idaho Panhandle National Forests Forest Plan (USDA Forest Service, 1978b), Forest Plan Final EIS (USDA Forest Service, 1978a), and the Record of Decision (USDA Forest Service, 1978c) consists of both forest-wide and area specific standards, guidelines, and goals that provide for land uses under a given set of management constraints. The management direction provided by this Forest Plan comprises the sideboards within which project planning and activities take place. The Forest Plan EIS also contains a general cumulative effects analysis of the anticipated overall forest management program i.e. effect on regional roadless values, regional wildlife populations, and the water quality of major drainage systems.

The second level of planning occurs during Forest Plan implementation. It involves the development, analysis, and effects disclosure of implementing a specific proposed project designed to achieve the overall goals and objectives of the Forest Plan. As a project specific analysis, it is not the purpose of this second level of planning to re-examine the basic land use allocations made through the Forest planning process nor to propose broad changes in those land use allocations.

This EIS will document the analysis of this second level of planning for the West Moyie Decision Area. The proposed action is not a general management plan for the Decision Area and this is not a programmatic EIS. If the decision-maker selects an action alternative, implementation of the activities specifically identified will begin as soon as possible. Timber sales proposed by this analysis would be sold in fiscal year 93, fiscal year 94, and fiscal year 95. (The agency's fiscal years run from October 1 through September 30 of the following year. Fiscal year 93 covers October 1, 1992 through September 30, 1993.) This schedule has been changed between the DEIS and FEIS to reflect the increase in the amount of planning associated with preparing this EIS. The average length of the timber sales would be three to four years, with two years following for site preparation and reforestation activities. These activities would be conducted within the Decision Area from 1993 until approximately 1998.

CHAPTER 2 ALTERNATIVES

Changes between Draft and Final

A number of changes will be evident in Chapter 2 between the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS). These changes were made in response to comments by the public and other agencies.

The greatest change is the addition of Alternatives EH and K. Alternative EH was proposed by a group of local residents to provide a compromise between impacts associated with roading and local timber industry needs and forest pest management needs in the Decision Area. Alternative K was developed in response to other public comments concerning primarily, water quality, wildlife, and visual quality.

The "Scoping" Section is now in Chapter 5.

Further analysis of the water quality and fisheries habitat conditions of the Moyie River drainage indicated that fine sediment and fry emergence are not limiting factors in maintaining fishery habitat in the river system. This conclusion was reached after the IPNF forest hydrologist and fisheries biologist reviewed the analysis and conducted a field review on the fisheries streams. The fisheries biologist from the Idaho Department of Fish and Game concurs with this finding (Horner, 1991). Based on this finding, emergence success, as predicted by the IPNF Sediment model is not used as an indicator in the FEIS. The results of the model and a discussion of its meaning are included in Appendix C.

One respondent requested that we consider a wilderness allocation alternative. Our analysis of this proposal is found in the "Alternatives Considered But Not Given Detailed Study" section.

The criteria to measure the effects of the proposed action and alternatives on visual quality has been expanded to include the amount of clearcutting and seedtree harvesting. The silvicultural practice of clearcutting received more comments than any other issue.

The volumes and the amount of riparian harvesting (measured by linear feet of affected streamside) for most of the alternatives have been adjusted. This adjustment was based on field verification of the preferred alternatives, additional data from stand exams, and new ideas formed from observations of logging activities on other timber sales within the vicinity.

Factual corrections have been made. The alternative descriptions have been corrected to accurately reflect the effects described in Chapter 4; some inconsistancies were noted in the DEIS.

The changes in harvest volumes between the Draft and Final EIS are summarized in the following table.

Table 2-1 Adjustments In Harvest Volumes Between Draft and Final EIS

ALTERNATIVE	VOLUME DEIS (MMBF)	VOLUME FEIS (MMBF)	NET CHANGE
B2	19.9	21.1	+ 0.2
D	7.7	7.9	+ 0.2
E	6.1	5.8	- 0.3
EH	N/A	15.7	N/A
H	11.8	11.8	0
I	7.1	7.2	+ 0.1
J1	10.3	11.2	+ 0.9
J2	12.0	12.9	+ 0.9
J2H	18.8	19.3	+ 0.5
K	N/A	15.9	N/A

INTRODUCTION

This chapter describes the alternatives that wholly or partially meet the purpose and need identified in Chapter One, and a No Action alternative. The action alternatives propose specific activities that could be implemented without further NEPA documentation. They are not programmatic alternatives.

The chapter has been divided into the following sections:

(1) Development of Alternatives (the development process)

(2) Alternatives Considered in Detail and Identification of the Preferred Alternative

(3) Alternatives Considered But Not Given Detailed Study

(4) Comparison of Alternatives

Eleven alternatives are considered in detail; a No Action alternative, and ten action alternatives. Each action alternative is a different combination and intensity of timber harvesting and road construction. These alternatives were designed to address the issues identified during scoping, while at least partially meeting the purpose and need described in Chapter One.

This chapter concludes with a comparison of the ways the alternatives respond to the issues. This information, along with the Chapter Four disclosure of projected environmental consequences of each alternative, provides information allowing the decision-maker to make a reasoned choice between alternatives. Forest Plan amendments that may be necessary to implement alternatives are described in the discussion of alternatives by issue in Chapter Four.

DEVELOPMENT OF ALTERNATIVES

Introduction

The development of alternatives for the Moyie Face Environmental Assessment (EA) began in the fall of 1987. Preparation of this EA was halted when the decision to prepare an Environmental Impact Statement (EIS) was made. Although the alternatives developed for the EA are not included in this Draft EIS, they formed the starting point for alternative development. Descriptions and maps of these alternatives are in the Moyie Face EA project files.

The Interdisciplinary (ID) Team developed alternatives in response to issues identified through internal scoping and public participation. Using an issue-driven process designed to address both Forest Service and public concerns, the ID Team developed alternative strategies and subsequent alternatives.

Environmental Issues

The scoping process determined the environmental issues to be addressed. Alternatives were developed that responded to five key issues: roadless character, water quality, visual quality, wildlife, and vegetation. Impacts of the proposed action and alternatives on recreation, cultural resources, air quality, and soil productivity are discussed in Chapters 3 and 4. The affect of the proposed action and alternatives on economics is discussed in Appendix E. The five key issues are discussed in the following section.

ISSUE NO. 1: Roadless Character

The proposed action would reduce the size of the Hellroaring Roadless Area. At the time the Forest Plan was being prepared, this area contained 11,700 contiguous roadless acres (Forest Plan EIS, Appendix C). Since that time timber management activities in the Hellroaring Creek drainage have reduced the size of the roadless area to 8,800 contiguous acres. The proposed action would further reduce the extent of the undeveloped roadless area.

The indicators used to evaluate potential impacts on the roadless character include:

1. Do enough acres remain to keep the area suitable for roadless classification?
2. Does sufficient roadless area remain to maintain the wilderness option?

In addition to the above indicators, a subjective roadless area analysis discussing the five roadless/wilderness qualities (Natural Integrity, Natural Appearance, Solitude, Primitive Recreation Opportunities, and Unique Features) has been prepared (see Chapter 4). A cumulative effects analysis of impacts to the Bonners Ferry Ranger District roadless resource has been added to Chapter 4 as well.

ISSUE NO. 2: Water Quality/Fisheries

The proposed action could affect water quality and fisheries habitat conditions within the Decision Area. Increased water yield and sediment yield associated with road construction and timber harvesting would be the main contributor to this impact. Increased water yield can decrease channel stability and increase bedload movement. Increased bedload movement could reduce pool size, quality, and frequency.

Increased sediment could affect public water systems by increasing the amount of disinfectants used. It could also result in higher costs associated with filtering and treatment to remove sediment and micro-organisms. Bacteria and other contaminants could ride through filtering systems on fine sediment particulates.

Upper Meadow Creek is a public water supply. The Beeline Water Association is responsible for the maintenance and operation of this water system. Additional domestic water sources have been identified within the area. Public input indicates that protection of water quality and domestic water developments are major concerns with individuals dependent on these water sources.

The indicator used to assess the impacts of the proposed action and alternatives on Upper Meadow Creek will be sediment yield over base. A threshold sediment yield increase was established specifically for Upper Meadow Creek. This was done by comparing past turbidity and maintenance monitoring by the water association to R1R4 model outputs for previous years' activities. This comparison provided a means to establish the threshold sediment yield at a level that would ensure that the public water use would be protected, based on historical data. The sediment yield will be based on R1R4 model outputs.

Fisheries streams within the Decision Area include the Moyie River, Bussard Creek, East Fork Meadow Creek, Lower Meadow Creek, Round Prairie Creek, and Hellroaring Creek. The State of Idaho Department of Fish and Game recognizes the Moyie River as supporting a significant trout fishery supported by stocking. Indicators to assess the impacts of the proposed action and alternatives on fisheries streams (non-consumptive), will be peak flow increases (using the Watbal model) and their effects on stream channel stability and sediment yield over base (using R1R4 model). These indicators are explained in more detail in Chapters 3 and 4.

ISSUE NO. 3: Visual Quality

The proposed action would change the visual condition of the Decision Area. The view can affect the enjoyment of the area for recreationists, other forest users and local residents. A major portion of the Decision Area is seen from primary travel routes, use areas, communities, and water bodies where visual resources are of high concern (Forest Plan, Appendix D page 15). Maintaining the visual integrity of the Moyie River corridor has been identified as a primary concern with local residents.

Conflicts have developed over the use of clearcutting due to the disturbed visual condition resulting from this harvest system. Many people have stated they would prefer some type of selective harvest.

Visual Condition Classes estimate levels of man-caused disturbance as perceived by the general public. This indicator measures in acres the existing conditions and effects on the visual resource. It accounts for the appearance of the landscape, and does not incorporate value judgements of people who may prefer one type of view to another.

For the Decision Area these Visual Condition Classes (VCC) compare to Forest Plan Visual Quality Objectives (VQO) as follows:

VCC	*VQO*
Untouched	Preservation
Unnoticed	Retention
Minor Disturbance	Partial Retention
Disturbed	Modification
Major Disturbance	Maximum Modification
Drastic Disturbance	Unacceptable Modification

Definitions for Visual Condition Classes can be found in the Glossary of this document. Definitions for Visual Quality Objectives can be found in Chapter 3, page 3-26.

To assess the potential impacts of the proposed action and alternatives on the visual resource, the DEIS will disclose:

1. What are the changes in acres by Visual Condition Class?

2. Is Forest Plan direction on visual quality being met?

3. What is the area harvested in terms of percent cover remaining after harvest? And, what is the area harvested by clearcut and seedtree cut systems as compared to other harvest methods.

4. What are the effects of harvesting as seen from specific viewpoints?

ISSUE NO. 4: Wildlife

The proposed action would affect wildlife species related to mature and old growth forest vegetation. It would also affect big game habitat. Chapter 3 describes the current wildlife conditions in the West Moyie area and Chapter 4 displays the effects the alternatives would have upon the wildlife habitat. The effects of the alternatives on other wildlife not included in the following discussions, are discussed in Appendix D of this Final EIS.

Mature/Old Growth Related Species

The proposed action would reduce the amount of old-growth habitat available within the Decision Area for old-growth related species. Public comments, appeals of decisions, and recent court cases in the Pacific Northwest indicate that this is a controversial issue.

Habitat for three wildlife species related to mature and old growth forest vegetation would be affected by the proposed action. These species are boreal owls, northern goshawks, and pine marten.

Boreal Owl

The Boreal Owl is a listed sensitive species. Suitable habitat exists in subalpine fir and higher elevation western hemlock and western red cedar habitat types. Timber harvesting associated with the proposed action would reduce the amount of habitat available for boreal owls.

The indicators used to evaluate the effects of the proposed action and alternatives on Boreal Owl are:

a. Amount of breeding habitat above 5000 feet in elevation.
b. Amount of foraging habitat above 5000 feet in elevation.

Northern Goshawk

The Northern Goshawk is a management indicator species, as designated by the IPNF Forest Plan (Appendix L). The proposed action would reduce the suitable habitat available for northern goshawks. The Decision Area currently provides suitable feeding and nesting habitat for this species.

The indicator used to determine the effects of the proposed action and alternatives on the goshawk population is retention of habitat of sufficient quality and quantity to support nesting pairs of goshawks. The Region One Habitat Suitability Index model for goshawks will be used to assess habitat quality.

Pine Marten

The Pine Marten is also a designated management indicator species. The proposed action would affect the availability of suitable habitat for pine marten. The Decision Area currently provides sufficient feeding and denning habitat for a resident pine marten population. Pine martens are known to be present in the Decision Area, mainly utilizing mature and old-growth timber in the higher elevation zones.

The indicators used to determine the effects of the proposed action and alternatives on the pine marten population are:

a. Retention of habitat blocks of sufficient size and quality to support two to three pine marten home ranges. The Region 1 Habitat Suitability Index model for pine marten will be used to assess habitat quality.

b. Maintenance of a suitable distribution of habitat and the retention of travel corridors for breeding interchange and the dispersal of young.

Big Game Indicator Species

Elk

The proposed action would affect the quality of the elk habitat within the Decision Area. This area contains one of the more popular spots for elk hunting within Boundary County.

The indicator used to determine the effect of the proposed action and alternatives on elk habitat will be habitat effectiveness as determined by the North Idaho Elk Habitat Guidelines.

White-tailed Deer

The proposed action would affect white-tailed deer habitat. The Decision Area provides year round habitat for white-tailed deer. Deer hunting is an important recreational activity in Boundary County.

The indicators to demonstrate the effects of the proposed action on this species are:

a. Winter range cover/opening ratio.

b. Winter range average regeneration unit size.

ISSUE NO. 5: Vegetation

This issue focuses on high risk stands of timber and short- and long-term timber supplies.

Mountain pine beetle is currently at endemic levels in the area's lodgepole pine stands. White pine mortality from blister rust is also present. The proposed action would reduce the susceptability of high risk timber to attack from these mortality agents.

Commercial timber production contributes employment and personal income to area residents, and adds federal receipts to the county government. The potential impact of the proposed action on the local economy is a concern of Boundary County agencies and local residents.

The Forest Plan directs that timber be managed to provide a sustained even-flow of products. This sustained yield helps ensure a continuous short and long-term supply of timber to the local economy. To provide a sustained even-flow of forest products, a forest needs a balanced age class distribution.

The indicators used to evaluate impacts on high risk stands and timber supply include:

a. Amount of high risk timber harvested (acres and board feet).

b. Timber volume to be offered (in million board feet).

c. Percent of suitable acres by size class.

d. Acres of old growth and potential old growth recruitment stands harvested.

ALTERNATIVES CONSIDERED IN DETAIL

Introduction

This portion of Chapter Two describes the ten action alternatives designed in response to the issues and the No Action alternative. This section will be segregated into two subsections, Features Common to All Action Alternatives, and Descriptions of Alternatives.

The alternatives considered, which will be described in more detail later in this Chapter, include:

Alternative A - This is the No Action alternative.

Alternative B2 - This alternative emphasizes providing timber to the local economy and achieving age-class distribution. Of all the alternatives considered, it would harvest the most timber.

Alternative D - This alternative emphasizes visual quality. Harvest units and new road construction would not be noticeable from the Moyie River.

Alternative E - This alternative emphasizes retaining the roadless character of the Hellroaring Roadless Area. No new roads would be constructed and no old growth would be harvested.

Alternative EH - This alternative was proposed by a group of local citizens from the Moyie River and Round Prairie area. This alternative would provide a compromise between the impacts associated with additional roading in the area and timber industry and pest management needs.

Alternative H - This alternative is the initial proposed action. It would harvest an acreage near that estimated through the Forest Plan ground truthing. However, the amount of timber supplied to the local economy would be less than estimated through ground truthing.

Alternative I - This alternative emphasizes managing big game winter range habitat for white-tailed deer. It would restrict cutting unit sizes and access within areas suitable for winter range. Timber harvest prescriptions would be designed with browse production as the primary objective.

Alternative J1 - Alternative J1 attempts to meet the nine objectives developed during the public involvement process. These objectives include harvesting timber at the ground truthing predicted levels while protecting wildlife habitat, water quality, old growth vegetation, visual quality, and recreation opportunities. The timber harvest level was reduced to below the ground truthing predicted levels to meet the other objectives.

Alternative J2 - This alternative attempts to harvest timber at Forest Plan ground truthing predicted acreage levels while meeting as many of the other objectives developed during the public involvement process as possible. The objectives not fully met include: limit clearcutting, manage area below 3,000 feet in elevation for winter range, and enhance recreation opportunities.

Alternative J2H - This alternative was designed to meet Forest Plan ground truthing timber volume output levels. It is identical to Alternative J2, except that it adds 1206 acres of timber harvest using helicopter logging systems.

Alternative K - the Preferred Alternative - This alternative was developed in response to the public comment on the DEIS and to agency concerns identified during further analysis by the ID Team. It is based on features from the other alternatives and ground truthing of the DEIS preferred alternatives. The alternative was designed to concentrate timber harvest in the high risk pine stands to reduce the potential for a mountain pine beetle epidemic. Other objectives of this alternative would: limit the impacts to visual quality within the Moyie River corridor; provide high water quality; provide suitable habitat for wildlife species, especially boreal owl, goshawk, and white-tailed deer winter range.

Each alternative is distinct, but alternatives contain some common features routinely applied by the Forest Service in land management. These include Regional and Forest standards, guidelines, and policies. To reduce the length and redundancy of the alternative descriptions, Features Common to All Action Alternatives or groups of action alternatives will be presented first.

FEATURES COMMON TO ALL ACTION ALTERNATIVES

Features common to all alternatives were developed by the interdisciplinary team to mitigate potential impacts to issues and resources. Many of these features are special timber sale contract provisions that will be included in timber sale contracts for the proposed sales. The 2400-6 contract provisions, in complete form, are located in Appendix A (USDA, 1973). Additional contract provisions that deal with soil and water conservation are discussed in Appendix C.

Water Quality and Soils

The Idaho Panhandle National Forests Plan states that "Soil and water conservation practices as outlined in the Soil and Water Conservation Practices Handbook (USDA Forest Service, 1988b) will be incorporated into all land use and project plans as a principal mechanism for controlling nonpoint pollution sources, meeting soil and water quality goals, and protecting beneficial uses."

The U.S. Forest Service and the State of Idaho entered into a Memorandum of Understanding (MOU), dated July 29, 1988, on the implementation of Best Management Practices. In this MOU the Forest Service agrees to meet or exceed the intent of the water quality protection elements of both the Idaho Forest Practices Act, Rules and Regulations, and the Best Management Practices (BMP's) for road and timber harvest activities by implementation of soil and water conservation practices as described in Forest Service Handbook 2509.22. These BMP's have been incorporated into the soil and water conservation practices identified in Appendix C.

Under all action alternatives, some timber harvest would occur in riparian areas. The amount and extent of riparian harvest is explained in the description of individual alternatives. In all cases, the BMP's pertaining to streamside protection zones and shading requirements will be adhered to. This will be accomplished through sale layout and marking.

Special timber sale contract mitigation measures that will be applied to all roads constructed within Upper Meadow Creek will include:
- the cut and fill slopes will be seeded and mulched,
- construction slash will be windrowed at the toe of the fill to trap sediment.

Timber sale contract provisions "C5.23# Control of Construction, C5.46 Snow Removal, C6.341 Prevention of Oil Spills, C6.6# Erosion Prevention and Control, C6.601# Erosion Control Seeding, and C6.602# Erosion Prevention and Control" will be included in each timber sale contract to insure that adequate erosion control measures are taken to protect the soil and water resources.

Special timber sale contract provisions "C6.34 Sanitation and Servicing within Municipal Watershed and C6.52 Protection of Streamcourses in a Municipal Watershed" will be included in the Queen Bussard Timber Sale contract to insure protection of the Upper Meadow Creek municipal watershed.

To minimize soil disturbance and displacement, the following practices will be implemented (see Appendix C for more information:

1. Slopes between 35 and 45 percent will not be tractor logged unless performed with a soft track machine or done over frozen ground with a snow cover.
2. Slopes in excess of 45 percent will not be tractor logged unless performed with a soft track machine over a snow cover.
3. All machine piling of harvest units will be done with a grapple piling machine.

These practices have been found to result in soil impacts well within Forest Plan standards (Ford, 1991).

Skid trails, landings, and temporary roads will be seeded to ensure rapid revegetation.

Visual Quality and Recreation

The effects of action alternatives will be mitigated to some extent by protection and enhancement measures. Trails and trailheads located in cutting units will be identified as improvements to be protected under the standard provisions of the timber sale contract or relocated. Sections of temporary roads and skid trails that cross or overlay segments of existing trails will be reclaimed to a trail condition at the conclusion of sale activities.

Additionally, all alternatives provide opportunities for increased access management through installation of trailhead signs, directional signs, interpretive signs, property signs, and route markers. This signing will provide greater information and direction to the recreating public.

The visual effects of harvest along trails would be further reduced by retaining additional vegetation adjacent to the trail or, as in the case of the helicopter logging, having a buffer strip of no harvest adjacent to the trail.

Wildlife

All timber management activities will be planned and implemented in compliance with Forest Plan standards for wildlife and old growth. These standards include measures for protecting old growth; threatened, endangered and sensitive species; wetlands; and cavity nesting species. The following standards and additional features will be maintained:

Old Growth - All alternatives will follow IPNF's Management Guidelines for Old Growth (Jerry, 1983). Under these guidelines, no old growth timber will be harvested in old growth management units where old growth vegetation comprises less than five percent of the forest vegetation.

The ID Team identified potential old growth recruitment stands in response to objectives identified through public involvement (see Alternative J1, J2, and J2H objectives, page 2-24). These stands of potential old growth recruitment were located in such a way as to compliment the existing old growth. They provide the option to manage for ten percent future old growth in each old growth management unit. They are located adjacent to the existing old growth stands to provide for large blocks of habitat and are composed of habitat types similar to existing old growth.

It is estimated that it will be approximately 60 years before these stands have the characteristics of old growth. Except as noted in the following alternative descriptions and Chapter 4, page 4-145, discussion on effects to old growth, these potential recruitment stands could be applied to any of the alternatives discussed in this FEIS. Additional potential old growth recruitment stands could be identified for alternatives that would harvest portions of the old growth or potential recruitment stands. However, the stands now identified as potential recruitment would best compliment the existing old growth.

Threatened, Endangered, and Sensitive Species - The analysis indicates there will be no impact to threatened and endangered species. However, to ensure protection of these species if potential impacts are discovered, sale contract provision "C6.25# Protection of Habitat of Endangered Species" will be included in each timber sale contract.

Bald Eagle - Nesting, feeding, and roost areas will be protected in accordance with the Pacific States Bald Eagle Recovery Plan (Forest Plan, Appendix X). If a bald eagle nest is located in the decision area in the future, a site-specific bald eagle nest management plan will be developed for the area, as outlined in the Montana Bald Eagle Management Plan (Forest Plan, Appendix II).

Wetlands - Special timber sale contract provision "C6.61# Wetland Protection" will be included in each timber sale contract to ensure protection of identified wetlands.

Coeur d'Alene Salamander - This salamander is known to be present at Little Hellroaring Falls. No alternatives will harvest timber within 500 feet of the falls; thus, the tree canopy which is shading the site will be retained.

Sensitive Species (Plants) - Habitat of sensitive plants listed in the Region One Sensitive Plant List will be protected under all alternatives. Field

surveys for sensitive plants have been made and the results are documented in the project file. Before timber is sold, additional sensitive plant surveys will be conducted in all harvest areas. Site-specific management plans will be developed if sensitive plants are encountered.

Road Management - For all alternatives, as a minimum, all new roads 1/2 mile or less in length will be closed with an earthern barrier and revegetated after post-sale activities are completed. New roads greater than 1/2 mile in length will be gated. Following timber harvest, roads will be open for fuelwood removal from the middle of July to one week before elk season, for a period of one to two years, as needed to clean up available firewood.

Cavity Nesting Species - All action alternatives will follow the IPNF Snag and Woody Down Timber Guidelines (Forest Plan, Appendix X). These guidelines describe methods for maintaining viable populations of snag-dependent wildlife species. The methods are incorporated into timber harvest, road construction, fuels disposal, and other management activities.

Pileated Woodpecker - All alternatives will provide for a minimum of one pileated woodpecker nesting area for each Old Growth Management Unit encompassing the decision area. Suitability for nesting is determined by the Region One Habitat Suitability Model.

Roads

Road planning and construction on the Bonners Ferry District follow certain standard procedures. These criteria minimize the impacts of new road construction and road reconstruction on water quality and other resources.

Planning and Location:
The Forest Plan contains basic direction which helps to identify the type and extent of activities a road will serve and provides the road operation and maintenance objectives. There are four traffic service levels (A,B,C,D) which describe a road's significant traffic characteristics and operating conditions. Road construction is planned only to the standard needed to serve the intended use.

The road management objectives for all new roads in the West Moyie Decision Area are for a single use (timber harvest) facility. These roads will all be similar in the fact that they will be relatively short, end-of-the line type facilities designed to accomodate logging and administrative traffic associated with timber harvest activities.

The construction design will be to traffic service level D which employs minimum standards necessary to remove timber safely, while protecting the road and adjacent resources (USDA Forest Service, 1987e). Roads at this service level are characterized by users limited to the single purpose (logging) and the volume of use is intermittent and usually controlled by the users. The road surface is rough and irregular; travel by low clearance vehicles would be difficult. Speeds are low.

These roads will be located with rolling grades and a contour-following alignment which requires a minimum of excavation. Steep slopes, unstable landforms, and steep V-shaped stream channels will be avoided. Logging systems that keep the miles of road needed to a minimum will be used.

Reconstruction is planned for several roads. Most of this reconstruction will bring existing level "D" local roads back up to standard by performing much delayed maintenance work. This will include brushing, ditch and culvert cleaning, and surface blading.

Reconstruction work will be performed on Tungsten Road 2485, a major collector accessing most of the Hellroaring drainage for both logging and recreation traffic. This work will reduce surface erosion and improve the driving surface to a service level B standard. The refinished surface would be stable for the predominant (logging) traffic for the normal use season. Periodic dust control may be needed. Smoothness of the road surface would be in line with the design speed. The road will be resurfaced from the junction with the Brush Lake Road 1004 to the junction with Road 2266; a distance of 7.2 miles.

Design:
Minimum road construction standards follow one of two basic designs. Roads with a 12 foot insloped surface and a ditch; or, roads with a 14 foot outsloped surface without a ditch ("no-ditch"). These design standards ensure that water will drain from the road surface, thereby protecting the road and adjacent resources.

The no-ditch design will be used in the drier, well drained or rocky areas. It will incorporate rolling dips, open-topped wood culverts, drivable water bars, or other similar erosion control devices. If large fills are necessary, fill material will be placed and compacted in successive layers.

Ditched road sections will have relief culverts placed at intervals that comply with recommended spacings for various grades and soil types to minimize ditch line erosion. Additional culverts will be placed in wet areas, springs and live streams.

Design and construction of stream crossings will follow "Rules and Regulations and Minimum Standards for Stream Channel Alterations" as adopted by the Idaho State Board of Water Resources. This manual prescribes proper sizing, alignment, and armouring of culverts, as well as other stream crossing specifications required by Idaho Code.

Hydrologic analysis will be used to design pipe sizes at live streams. Major culverts will be sized to function effectively at 50 year peak flows, without water backing up. These culverts will be tested to withstand 100 year or greater peak flows without failing. All other live streams will be sized to function effectively at 20 year peak flows and withstand 50 year or greater peak levels without failing. Riprap will be required at live stream culvert inlets. In addition all culverts at Bussard Creek crossings will be designed for fish passage.

Slash windrows will be required in most areas. They lower road construction costs and reduce sediment production from fill slopes. Fire breaks and breaks for wildlife crossings will be left in the windrows. Where slash windrows are not desirable or practical, other methods of erosion control such as straw bale or fabric sediment fences will be used. Cut and fill slopes and other areas of exposed soil outside the road surface will be seeded and fertilized for long term erosion reduction.

Construction:
Forest Service Specifications for Construction of Roads & Minor Drainage Structures and for Bridges and Major Drainage Structures will be used for all specified road construction in the West Moyie Decision Area. In particular, Idaho Panhandle National Forests Special Project Specification 204, Soil Erosion & Water Pollution Control, will be used. This specification requires, among other items, that erosion control measures be incorporated into the project at the earliest practical time. It also limits the amount of construction activity that can be carried out beyond the normal road construction operating season.

Road Management:
Fuelwood gathering will be allowed before final closure on all roads scheduled to be closed. The time period for fuelwood gathering will be as follows:

- Roads will be open during periods of timber sale activity to allow fuelwood gathering where it will not interfere with logging operations or the safety of fuelwood gatherers.

- Roads will be opened prior to slash burning to allow fuelwood removal. This is planned for the time period from mid-July to one week before elk season and will be done for one or two years as needed to clean up available fuelwood.

Cultural Resources

A cultural resource survey of the Decision Area has been completed (see project file). All sites have been recorded and a determination has been made to the extent of protection required. During project layout on the ground, further field investigation will be conducted to identify any additional unknown cultural sites.

Between the Draft EIS and the Final EIS additional prehistoric sites have been discovered in the Moyie River Valley. The new discoveries have provided information allowing for a new prediction model for identifying high potential areas. All proposed units from the alternatives that would

impact these sites with high potential would be intensively field surveyed to verify the previous cultural resource clearance. A decision will be made to avoid, protect, or mitigate newly discovered sites in accordance with the National Historic Preservation Act.

In cutting units where skidding equipment will cross historic trails, crossings will be located and limited to two such crossings per unit. Additionally, to reduce disturbance to the historic values of the trails, skidding across these trails will be restricted to winter seasons, when the ground is frozen or snow-covered.

Special timber sale contract provision "C6.24# Protection of Cultural Resources" will be included in each timber sale contract to insure protection of cultural sites.

Air Quality

In disposal of timber harvest residues (slash), smoke management guidelines will be followed as prescribed in the Montana Smoke Management Memorandum of Agreement (1978) and the State of Idaho Air Quality Implementation Plan. These guidelines are intended to keep air pollution from smoke to acceptable levels. The agreements and memorandums are described in more detail in Chapter 3 of this document.

Noxious Weeds

Noxious weeds will be managed as prescribed in the IPNF Weed Pest Management FEIS (USDA Forest Service, 1989g). This document incorporates public input and weed control policies of the Forest Service and Bureau of Land Management into a five-year integrated weed management program for the IPNF. In accordance with program guidelines and the Weed Management FEIS Record of Decision, likely areas of weed infestations will be surveyed, and new or established infestations monitored and treated.

Alternative Descriptions

Introduction

This section describes the various alternatives. These alternatives were developed to feature the key issues and give the decision-maker a basis for comparison in determining how to implement the Forest Plan.

For detailed, specific information on harvest areas, see the alternative maps (attached) and Appendix A. This appendix lists stand, size, Management Area, harvest prescription, harvest method, volume of timber harvested, and prescribed fuels treatment for each proposed harvest unit. Appendix A also defines the different silvicultural harvest systems, and contains a description of the silvicultural analysis process used in developing alternatives.

Alternative A: No Action

Purpose:
Under this alternative, which is required by NEPA, no action would be taken to respond to the purpose and need identified in Chapter One. Big game winter range forage would not improve; however, cover would be retained. There would be no timber supplied to area mills, as no further timber harvesting, road construction, or road reconstruction would take place. No progress would be made toward long-term sustained yield of timber products. Because high risk stands of timber would not be treated, mortality and growth loss due to insects and disease would occur.

This alternative retains the current roadless character of the Hellroaring roadless area. The opportunity for Congress to consider the entire roadless area for wilderness inclusion into the National Wilderness Preservation System would be retained. The No Action alternative would not impact water quality, visual quality, or wildlife related to mature or old growth vegetation.

This alternative provides a baseline to compare the amount and rate of change of all the other alternatives, and preserves future options. The decision to implement this alternative will in no way impose similar decisions on private property owners within the Decision Area. Table 2-2 on

page 2-32, displays the actions of Alternative A compared to other alternatives.

Alternative B2

Purpose:
This alternative was designed to assess the trade-offs between providing a significant amount of timber and other resource objectives. The Moyie Face EA alternatives, the Forest Plan timber output ground truthing process, and the dependence of Boundary County on the supply of national forest timber formed the basis for this alternative.

Alternative B2 partially satisifies the purpose and need; it does provide a substantial amount of timber for the timber industry and moves the Decision Area towards a more balanced age class distribution, thereby promoting long-term sustained yield of forest products. It would treat about 20 percent of the high risk timber stands. It also would provide a great deal of winter range forage. However, it does not provide adequate cover for white-tailed deer to fully utilize the winter range area.

Alternative B2 demonstrates the impacts to the roadless resource, water quality, visual quality, wildlife, and vegetation that would occur with a 21,070 MBF level of timber harvest.

Road construction would leave about 2600 acres of the Hellroaring Roadless Area unroaded, thereby foregoing the option for wilderness designation of this area. Water quality would be impacted with the increased sedimentation due to road construction, timber harvest, and associated activities. Forest Plan Visual Quality Objectives would not be met, clearcutting and seedtree harvesting would be obvious to most forest visitors.

Wildlife related to mature and old growth forest vegetation would be adversely affected. This alternative would harvest 16 acres of old growth and 40 acres of potential old growth recruitment stands. Nesting and feeding habitat for boreal owl would be further reduced below the threshold level determined necessary to maintain a local population. Based on Habitat Suitability Index (HSI) model interpretations, goshawk habitat suitability would be reduced to a level that would preclude goshawk occupancy of the Decision Area. Based on the HSI model interpretation for pine marten, an additional 4191 acres would become unsuitable for habitat in the northern half of the Decision Area due to increased road density. There would be potential for increased trapping mortality of the pine marten as well.

Specific Features:
Alternative B2 would harvest a total of 2290 acres. A total of 62 cutting units would be created. 640 acres would be clearcut and 530 acres would be seed tree harvested for a total of 1170 acres of even-aged regeneration harvesting.

275 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 290 acres would be commercially thinned to promote growth. Sanitation/salvage harvesting would be implemented on 420 acres to harvest dead, dying and high risk timber. The overstory would be removed on 135 acres, leaving a stand of stocked regeneration.

Access to treat these harvest units would require 20.5 miles of road construction and 12.6 miles of reconstruction. Three timber sales totaling 21.1 million board feet (MMBF) would be offered for sale.

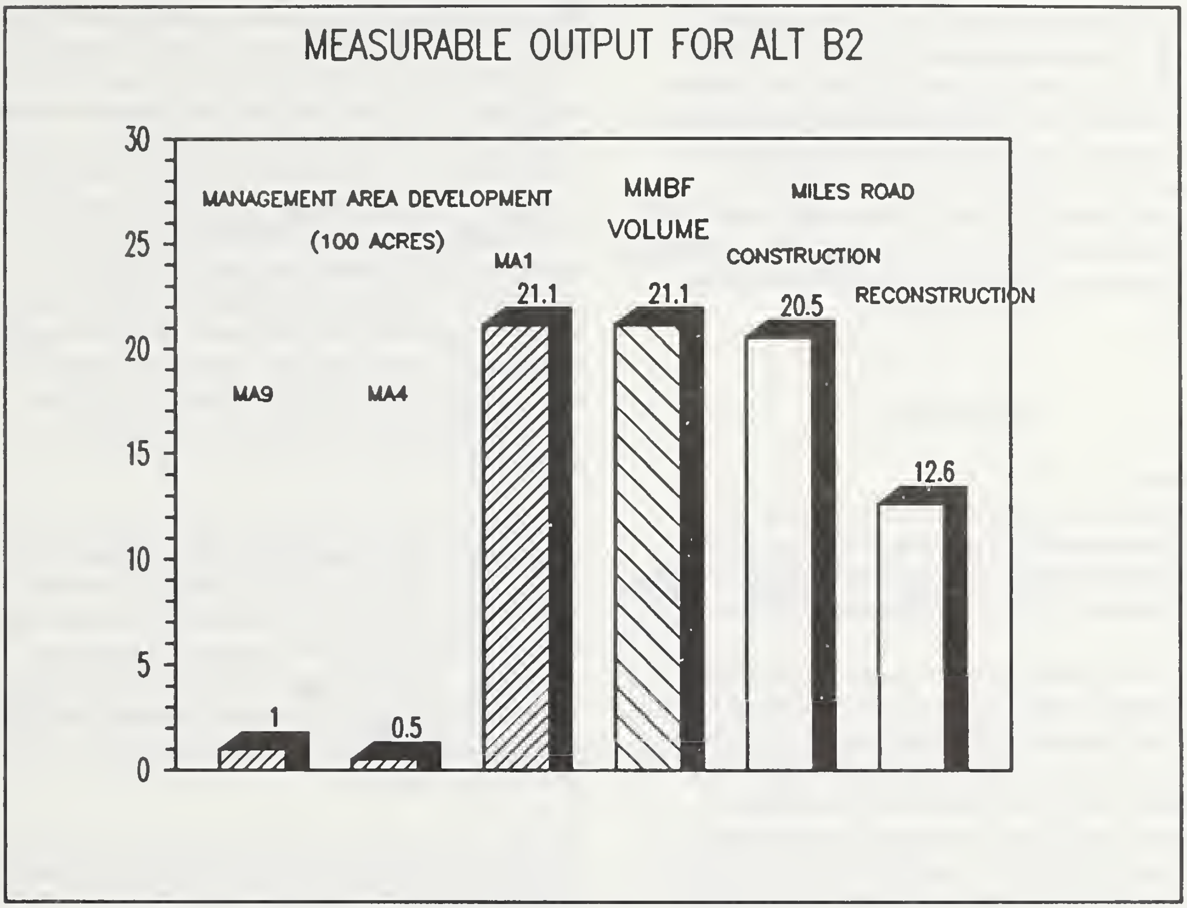


FIGURE 2-1

This chart shows the common measurable items of Acres Developed in each Management Area, Million Board Feet (MMBF) of timber yield, and the Miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

Timber would be harvested from riparian areas using all cutting methods. Streamcourses within these areas vary from unnamed intermittent streams to major tributaries of the Moyie River. Clearcutting would occur along 2450 feet of streamcourses. Harvesting using the seed tree method would take place along 2600 feet of streamcourses, including 400 feet along Little Hellroaring Creek. Timber would be salvaged from 3600 feet of streamcourses. Basal area or commercial thinning would be done along 2200 feet of streamcourses, including 500 feet along Round Prairie creek.

Alternative B2 would require one tractor skid road crossing of an unnamed stream in Unit 33. Road construction would require 17 new stream cross-

ings, including a crossing of Little Hellroaring Creek and two crossings of Bussard Creek.

Skidding methods include: 1645 acres tractor skidding, 75 acres helicopter yarding, and 570 acres skyline yarding. Slash disposal/site preparation will include 395 acres broadcast burning; 200 acres underburning; 405 acres of grapple piling and burning; and 1290 acres of yarding tops, piling and burning landings. Even-aged reforestation would consist of 175 acres natural regeneration, 995 acres of planting, and 95 acres of spot planting.

Alternative D

Purpose:
This alternative was designed to assess the trade-offs involved in providing a greater degree of visual quality protection compared to the visual quality impacts of the initial proposed action.

Alternative D would partially meet the purpose and need by providing logs to area mills, but at a lower level than the initial proposed action. Some high-risk pine stands would be harvested. The alternative would not result in an increased sustained yield due to continued imbalance in the age class distribution. In addition, this alternative would create little additional winter range forage of desirable quality and distribution. It would, however, retain much of the existing cover.

Although Alternative D would decrease the size of the Hellroaring Roadless Area, it would retain about 5600 acres in the roadless category. This would leave the Hellroaring Area available for Congressional consideration as wilderness.

Under this alternative, water quality would be impacted by increased sedimentation due to road construction and timber harvest. However, Forest Plan and State of Idaho water quality standards would be met. There would be some impact to wildlife species related to old-growth and mature vegetation. This alternative would harvest 14 acres of old growth and 42 acres of potential old growth recruitment stands. Effects upon the boreal owl would be minimal. Based on the HSI model interpretation, goshawk habitat would be maintained above the level required to support a breeding pair. For pine marten, standard cover would be reduced to below minimum levels needed to maintain marten on 2233 additional acres in the northern portion of the decision area. New roads could increase trapping mortality of the marten as well.

Alternative D would provide a level of visual quality greater than the visual quality objectives of the Forest Plan. Under this alternative, no harvest units or new road construction would be noticeable from the Moyie River. No clearcut or seedtree harvesting would be done. Intermediate harvests would occur in stands meeting criteria developed during the silvicultural analysis (Appendix A) for this type of harvest.

Only stands suitable for even-aged regeneration using the less noticeable shelterwood system are included in this alternative. The trees left on the shelterwood units would be removed in two stages. The first stage of removal will be at the time the regeneration becomes established and will harvest approximately 50 percent of the trees. The remainder of the shelterwood trees will be left until the regeneration is of sufficient height (approximately 60 ft.) to soften the appearance of the edges of the harvest units.

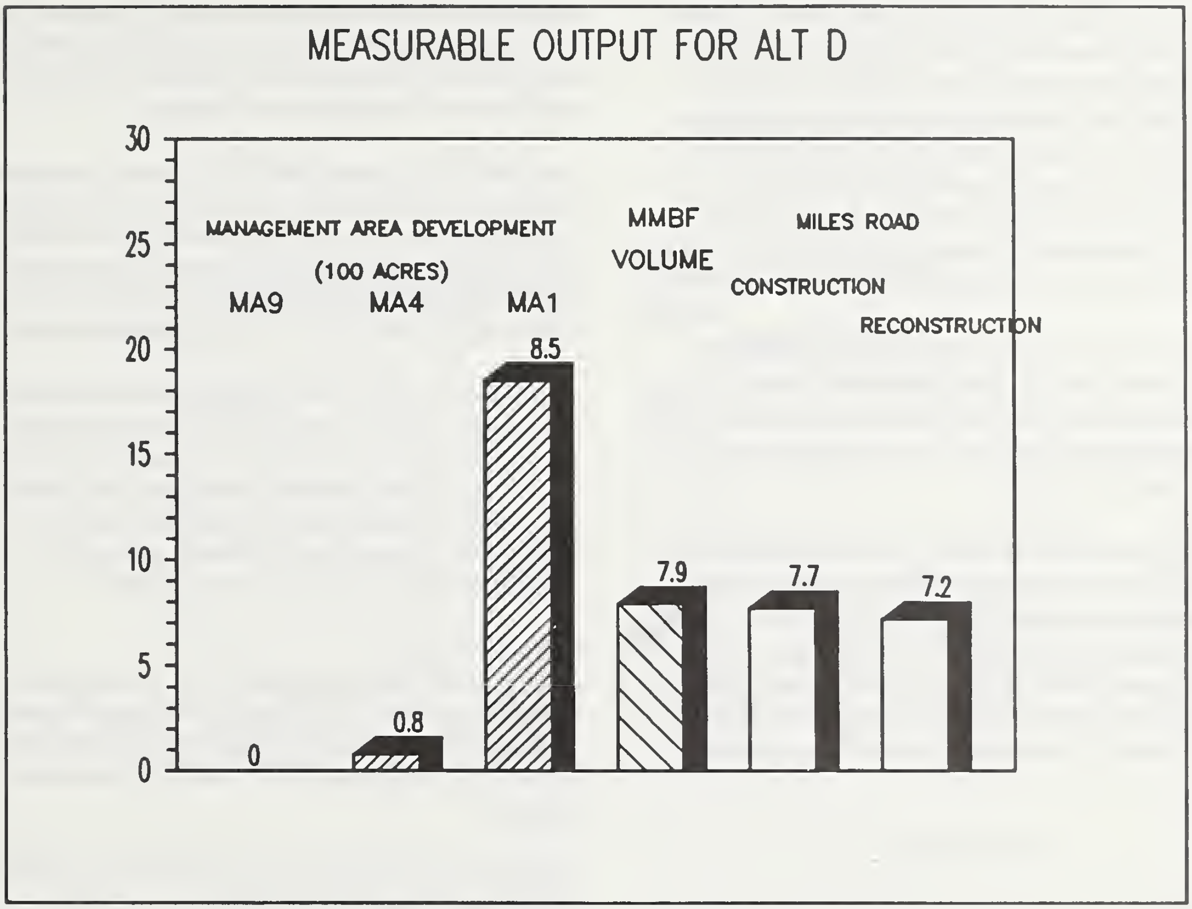


FIGURE 2-2

This chart shows the common measurable items of Acres Developed in each Management Area, Million Board Feet (MMBF) of timber yield, and the Miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

Specific Features:
Alternative D would harvest a total of 1945 acres. A total of 29 units would be created. Even-aged management would consist of 105 acres of shelterwood harvests. Uneven-aged management would be implemented on 270 acres. 520 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 195 acres would be commercially thinned to promote growth. Sanitation salvage harvesting would be implemented on 855 acres to harvest dead, dying and high risk timber.

Access to treat these harvest units would require 7.7 miles of road construction and 7.2 miles of reconstruction. Three timber sales totaling 7.9 MMBF would be offered for sale.

Timber harvest would occur in riparian areas adjacent to unnamed streams and major tributaries to the Moyie River. Shelterwood harvest would occur in 1800 linear feet of riparian area. Uneven-age management would be implemented along 10,600 feet of streamcourse. Timber would be salvaged from 15,000 linear feet of riparian area, including 1000 feet along McDougal Creek and 800 feet in the upper reaches of Wall Creek. Commercial and basal area thinning would be used to harvest timber along 5600 feet of streams, including 5400 feet adjacent to Hellroaring Creek.

One tractor skid road crossing of an unnamed stream would be needed to harvest timber in Unit 33. Road construction would require installation of 14 new stream crossings. Two of these would cross Bussard Creek.

Skidding methods include: 1780 acres tractor skidding and 165 acres skyline yarding. Slash disposal/site preparation will include 40 acres of underburning; 65 acres of grapple piling and burning; and 1840 acres of yarding tops, piling and burning landings. Even-aged reforestation will consist of 105 acres of natural regeneration.

Alternative E

Purpose:
This alternative helps define the trade-offs between the initial proposed action and the retention of existing roadless character, increased water quality protection, and old growth retention.

Alternative E would only partially satisfy the purpose and need because it would not result in an increased sustained yield due to continued imbalance in age class distribution. Alternative E would harvest some timber stands that are at high risk due to mountain pine beetle and blister rust, but it would leave several other high-risk stands untreated. It would provide some logs to area sawmills. It would not increase winter range browse production; however, it would retain much of the existing cover.

Alternative E leaves the Hellroaring Roadless Area untouched by timber harvest and road construction, thereby preserving the option of including it into the National Wilderness System.

The alternative would have minor effects on water quality due to timber harvest activities. However, because roading would be confined to reconstruction of existing roads, with no new roads being built, the potential impacts to water quality would be low compared to the initial proposed action.

Alternative E would meet Forest Plan visual quality objectives. Based on HSI model interpretations, it would have little or no effect on boreal owl, northern goshawk, or pine marten populations. All existing old growth habitat would be retained by this alternative. 21 acres of potential old growth recruitment stands would be harvested.

Specific Features:
Cutting units were designed for this alternative using Alternative H as a guide. The major difference is units that required new road construction or were within the inventoried roadless area were deleted.

Alternative E would harvest 990 acres. A total of 19 cutting units would be created. 105 acres would be seed tree harvested and 60 acres would be shelterwood harvested for a total of 165 acres of even-aged regeneration harvesting. 80 acres would be treated with uneven-aged regeneration harvesting methods. 275 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 110 acres would be commercially thinned to promote growth.

Sanitation salvage harvesting would be implemented on 360 acres to harvest dead, dying and high risk timber. Access to treat these harvest units would require 7.2 miles of reconstruction. Three timber sales totaling 5.8 MMBF would be offered for sale.

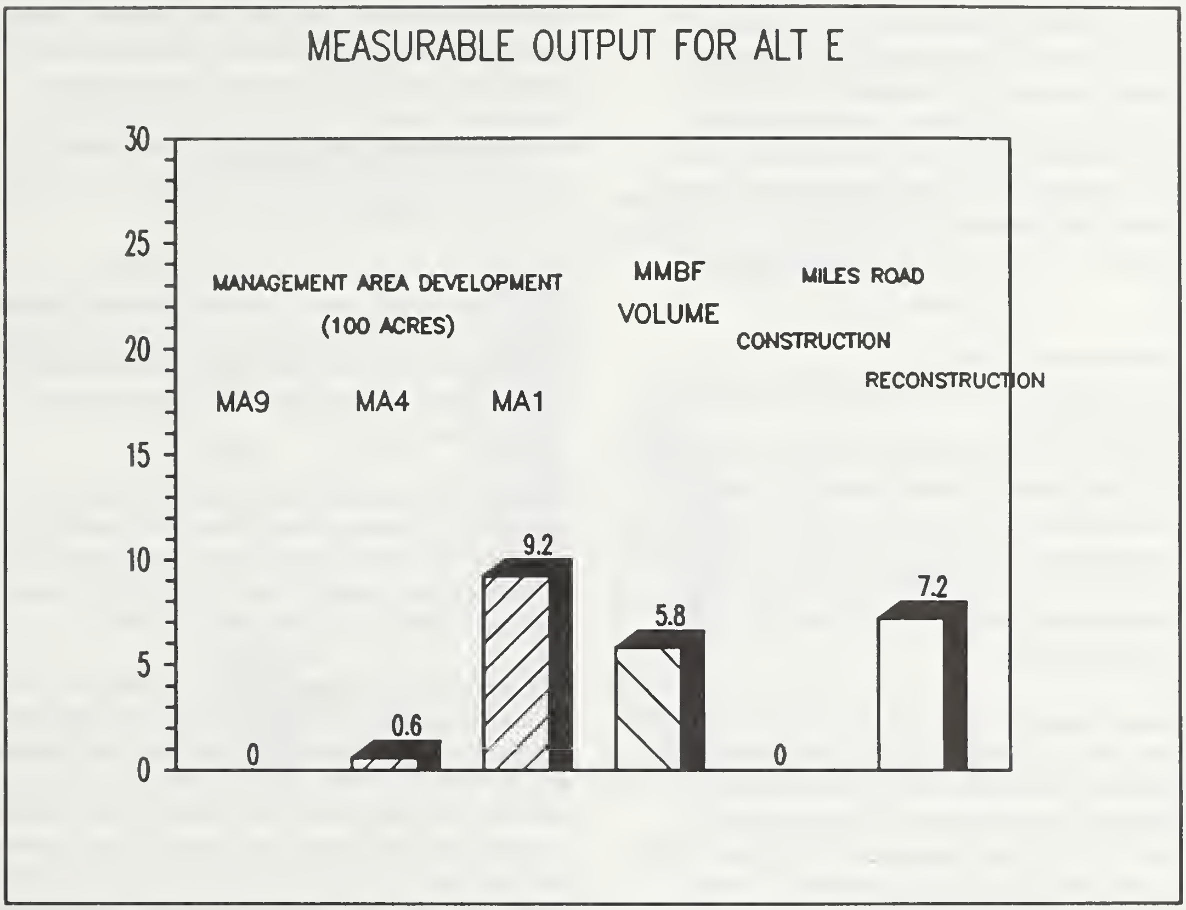


FIGURE 2-3

This chart shows the common measurable items of Acres Developed in each Management Area, Million Board Feet (MMBF) of timber yield, and the Miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

Salvage/sanitation cutting would occur in riparian areas along 4600 feet of streamcourses, including 1000 feet along McDougal Creek and 3600 feet along Hellroaring Creek. Commercial and basal area thinning would be done in riparian areas adjacent to 1500 feet of unnamed streams. One skid road stream crossing would be needed to log Unit 33. No new road crossings would be needed, as no new roads will be constructed under this alternative.

Skidding methods include 800 acres of tractor skidding and 190 acres of skyline yarding. Slash disposal/site preparation will include 40 acres underburning; 125 acres of grapple piling and burning; and 825 acres of yarding tops, piling and burning landings. Reforestation will consist of 100 acres of natural regeneration and 65 acres of planting.

Alternative EH

This alternative was proposed in response to the DEIS by a group of citizens that live adjacent to the Decision Area. It was designed to provide a compromise between the impacts of additional road construction in the area and the need to provide a reasonable amount of timber for local industry and the need to reduce long term risks from insect and disease. The alternative is a combination of other alternatives described as follows:

1. Alternative E, plus
2. The helicopter option described in Alternative J2H, plus
3. Adding to the helicopter option (i.e. harvest by helicopter or other method that would not require road construction) all those stands from J1 which are high risk stands and all those stands whose proposed harvest methods leave at least 50% of the existing trees.

The harvest prescription for two units (33 and 37) from Alternative E were changed from shelterwood to uneven age management to better reflect Management Area 4 needs and visual quality concerns. The harvest prescriptions for four units (10, 13, 18, and 19) from Alternative J1 were changed from seed tree to shelterwood to better meet the visual quality concerns.

This alternative partially satisifies the stated purpose and need. It would provide timber to area sawmills at a level of 92 percent of the amount predicted by the Forest Plan timber yield ground truthing. It would move the Decision Area toward a more balanced age class distribution, thereby making progress toward long-term sustained yield of forest products.

About 53 percent of the high risk stands would be treated under this alternative. This activity would salvage timber that would otherwise be lost in some stands and basal area thin other stands to reduce the lodgepole pine susceptibility to mountain pine beetle infestation.

Alternative EH would leave approximately 2050 acres in the roadless category. This action would eliminate the opportunity to include the Hellroaring Roadless Area in the National Wilderness Preservation System for the time being. Since no roads would be constructed into the roadless area, vegetation could recover to the point that the area would again meet the characteristics of a roadless area at some point in the future. However, it is unlikely that this would occur.

This has happened in the past in this area. The area was burned over by wildfire around the turn of the century. Fire killed timber was salvage logged for fuelwood and railroad ties by local residents. The evidence of this past activity has mostly disappeared.

There would be a slight increase in sediment yield with this alternative. Since there would be no new road construction, this increase would be minimal. Water quality objectives of the Forest Plan and State of Idaho would be met.

Alternative EH would meet visual quality objectives of the Forest Plan. Recreation opportunities would be somewhat protected, as shelterwood systems would be used in even-aged management adjacent to trails; but logging would occur on both sides of some trails. Final overstory removal from seedtree and shelterwood units in visually sensitive areas would not be done until regeneration is recovered to the point that past management activities are not noticable (approximately 60 years).

There would be no harvest of existing old growth habitat, there would be 21 acres of potential old-growth recruitment harvested. Boreal owl habitat would be further reduced to below the recommended nesting area thought to be required to maintain the local population. Based on HSI model interpretations:

- Effects on pine marten cover would be minimal, there would be no greater risk of trapping as no new roads would be constructed.
- Due to a reduction in feeding habitat and disturbance to practically all nesting stands, the entire Decision Area would be unsuitable as goshawk habitat.

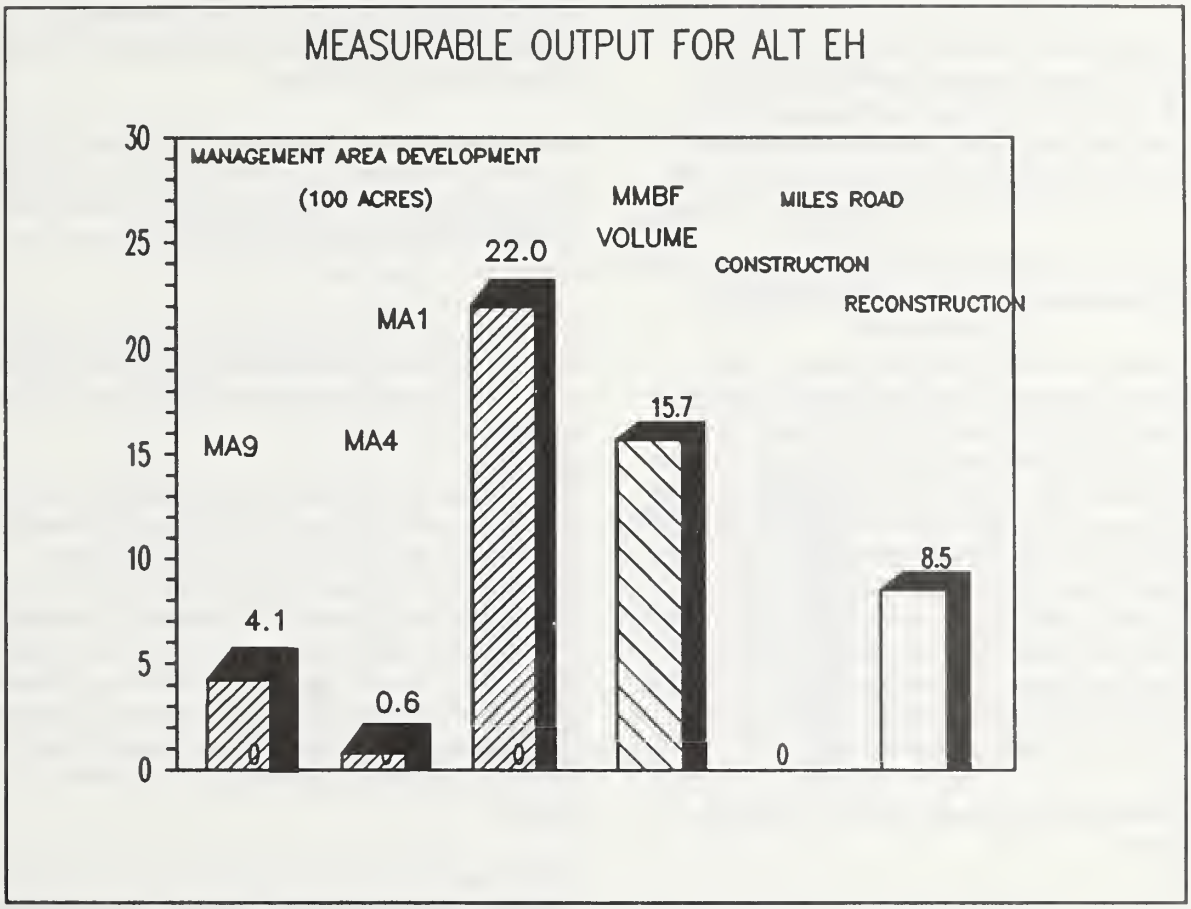


FIGURE 2-4

This chart shows the common measurable items of acres harvested in each Management Area, Million Board Feet (MMBF) of timber yield, and the miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

Specific Features:
Alternative EH would harvest a total of 2669 acres. A total of 51 cutting units would be created. 160 acres would be seed tree harvested and 333 acres would be shelterwood harvested for a total of 493 acres of even-aged regeneration harvesting. 80 acres would be harvested using uneven-aged regeneration systems.

The overstory would be removed on 149 acres. 497 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 278 acres would be commercially thinned to promote growth. Sanitation salvage harvesting would be implemented on 1172 acres to harvest dead, dying and high risk timber.

Access to treat these harvest units would require 8.5 miles of reconstruction. Four timber sales totaling 15.7 MMBF would be offered for sale.

Skidding methods include 1010 acres tractor skidding, 145 acres skyline yarding, and 1514 acres of helicopter yarding. Slash disposal/site preparation will include 40 acres underburning; 245 acres of grapple piling and burning; and 995 acres of yarding tops, piling, and burning landings.

Even-aged reforestation consists of 428 acres natural regeneration and 85 acres of planting.

Timber would be cut in several riparian areas adjacent to tributaries of the Moyie River. Extensive salvage/sanitation harvesting, amounting to 44,600 feet along streamcourses, would be done in these riparian zones. This would include salvage harvesting 3600 feet in the upper reaches of Hellroaring Creek, 9200 feet along Rutledge Creek, and 3200 feet in the Queen Lake fork of Bussard Creek. Uneven-aged management would remove timber from about 800 linear feet of riparian area. 7,400 linear feet would undergo basal area or commercial thinning. Shelterwood harvesting would occur adjacent to 2,000 feet of riparian zone.

A skid road stream crossing would be needed to log Unit 33.

Alternative H

Purpose

This alternative was designed to provide a timber harvest acreage near Forest Plan ground truthing levels. It is presented in this analysis as the initial proposed action and as a basis against which other alternatives may be compared.

Alternative H partially satisifies the purpose and need by providing timber for area mills and moving the Decision Area toward a more balanced age class distribution. Some high risk timber would be harvested under Alternative H, but over 80 percent of these stands would remain untreated. Alternative H would provide winter range forage. Cover would be maintained within the recommended 60 to 80 percent range, but the units would be larger than recommended (Jageman, 1984). Some of the increase in browse may not be available for deer to utilize during the winter.

Under Alternative H, less than 5000 acres of the Hellroaring Roadless Area would remain unroaded. Thus, the opportunity to include any of this area into the National Wilderness System would be foregone.

This alternative would increase stream sedimentation due to road building and timber harvest, but would still be within Forest Plan and State of Idaho water quality standards.

There would be impacts to visual quality, but the alternative would still meet visual quality objectives adopted by the Forest Plan. Sizes, shapes, locations, and harvesting prescriptions of cutting units would be adjusted as compared to Alternative B2. Unit sizes within sensitive view areas would be reduced. Where possible, seedtree and shelterwood harvests would be used instead of clearcutting. Even-aged management adjacent to trails would be accomplished using the shelterwood system.

Wildlife species related to mature and old growth forest vegetation would be affected by Alternative H. There would be some reduction in boreal owl nesting and forage habitat, partly due to the 14 acres of old growth spruce-fir forest and 16 acres of potential old growth recruitment that would be harvested. Based on the HSI model interpretation:

- Suitable goshawk habitat would be reduced, but would still provide habitat necessary to support one pair.
- Cover habitat for pine marten would be reduced in the northern portion of the Decision Area resulting in the loss of an additional 2233 acres of suitable habitat due to increased risk of trapping.
- New roads could increase trapping mortality of pine marten.

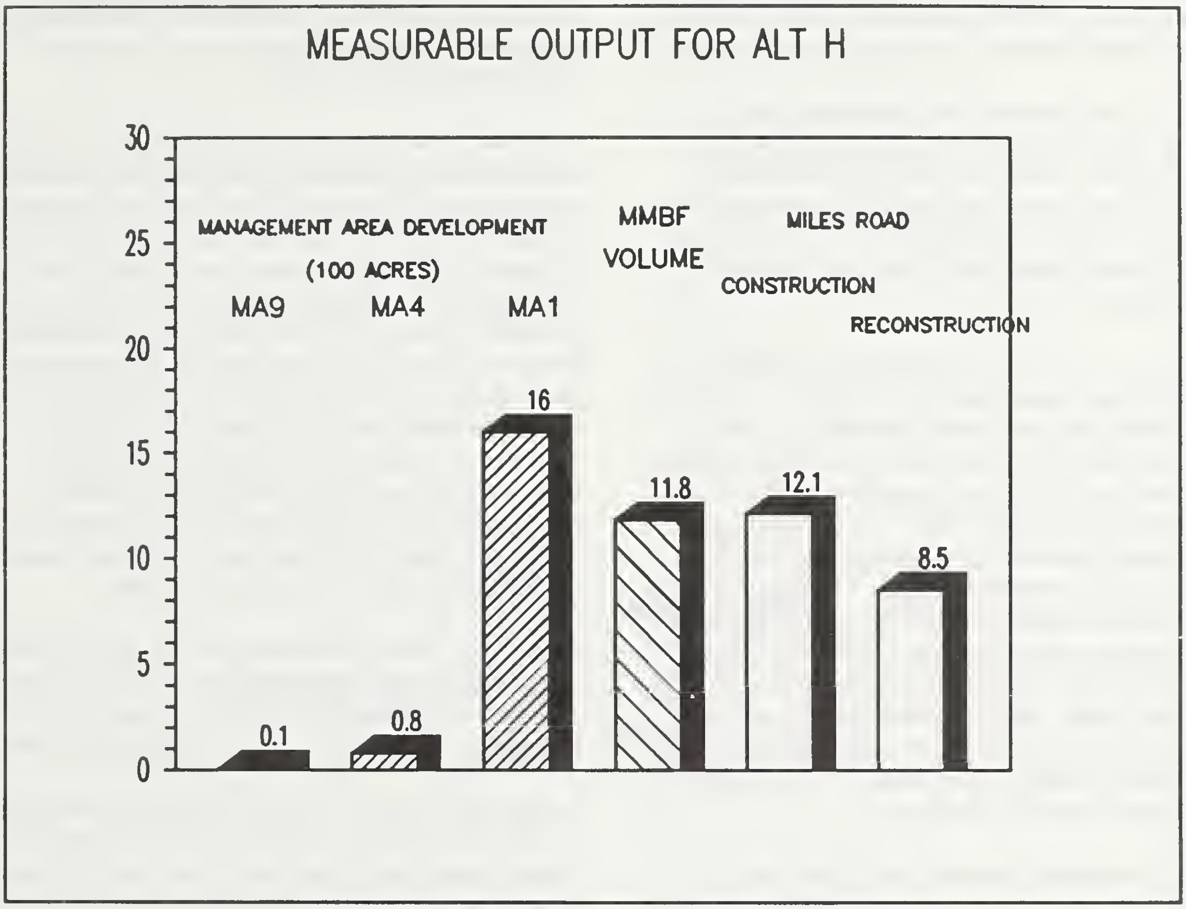


FIGURE 2-5

This chart shows the common measurable items of acres harvested in each Management Area, Million Board Feet (MMBF) of timber yield, and the miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

Specific Features:
To create Alternative H, some harvest units and roads were eliminated. The intention was to reduce stream crossings and avoid sensitive areas in the Bussard Creek, Bussard Lake, and Upper Meadow Creek areas. Still, some harvest would occur in riparian areas under this alternative.

Alternative H would prescribe timber harvest in riparian areas adjacent to several unnamed streams and some major tributaries to the Moyie River. 800 feet adjacent to upper Wall Creek would be clearcut. Seed tree harvesting would occur along 400 feet of Little Hellroaring Creek. Shelterwood cutting would be used along 1300 feet of unnamed streams. Uneven-aged management would be employed in 2400 linear feet of riparian areas.

Salvage and sanitation harvesting would occur adjacent to 7600 feet of streamcourses. 1300 linear feet of riparian area would be commercial thinned along a fork of Hellroaring Creek and 500 feet would be thinned along Round Prairie Creek.

Access to treat harvest units would require 12.1 miles of road construction and 8.5 miles of reconstruction. One skid road stream crossing would be needed to log Unit 33. 13 new stream crossings would be needed in road construction. These include crossings of Bussard Creek and Little Hellroaring Creek.

Alternative H would harvest a total of 1695 acres in three timber sales totaling 11.8 MMBF. A total of 45 cutting units would be created. 125 acres would be clearcut, 325 acres would be seed tree harvested, and 133 acres would be shelterwood harvested for a total of 583 acres of even-aged regeneration harvesting. Uneven aged management would be implemented on 140 acres. 275 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 185 acres would be commercially thinned to promote growth. Sanitation/salvage harvesting would be implemented on 440 acres to harvest dead, dying and high risk timber. The overstory would be removed on 72 acres.

Skidding methods include: 1431 acres tractor skidding, 14 acres tractor/skyline swing, and 250 acres skyline yarding. Slash disposal/site preparation will include 45 acres broadcast burning; 125 acres underburning; 413 acres of grapple piling and burning; and 1112 acres of yarding tops, piling, and burning landings.

Even-aged reforestation will consist of 353 acres of natural regeneration, 230 acres of planting, and 32 acres of spot planting.

Alternative I

Purpose:
This alternative was designed to assess the trade-offs involved in providing a higher quality white-tailed deer winter range compared to the winter range impacts of the initial proposed action. A timber harvesting pattern was developed to improve quality and distribution of browse while maintaining cover areas of 40 acres or larger adjacent to browse areas.

This alternative would partially satisfy the purpose and need by improving winter range browse, but some thermal cover would be lost. The alternative would provide timber to area sawmills, but not to the level necessary to meet the Forest Plan Allowable Sale Quantity. Implementing this alternative would not result in an increased sustained yield because of the continuing imbalance in age class distribution. Alternative I would not treat several timber stands that are at high risk of mountain pine beetle and blister rust damage. Most of the big game winter range area is comprised of these high risk stands; failure to treat them now increases the risk of future loss of thermal cover due to increased mortality.

Alternative I would decrease the unroaded portion of the Hellroaring Roadless Area to 3400 acres. This action would eliminate the opportunity for including it into the National Wilderness System.

Road building and timber harvest under Alternative I would contribute sediment to area streams, but water quality would still meet objectives of the Forest Plan and State of Idaho standards. These activities would also affect visual quality; however, the result would still meet the adopted visual quality objectives of the Forest Plan.

Alternative I would result in the construction of a road through an existing old growth stand in the East Fork of Meadow Creek, resulting in the fragmentation of nine acres of old growth. It would further reduce boreal owl nesting habitat to a level below that necessary to maintain a local population. Based on the HSI model interpretation, habitat for northern goshawk would be maintained at the level necessary to sustain a breeding pair. There would be minimal effects to pine marten populations under this alternative; risk of trapping due to increased road access would be greater.

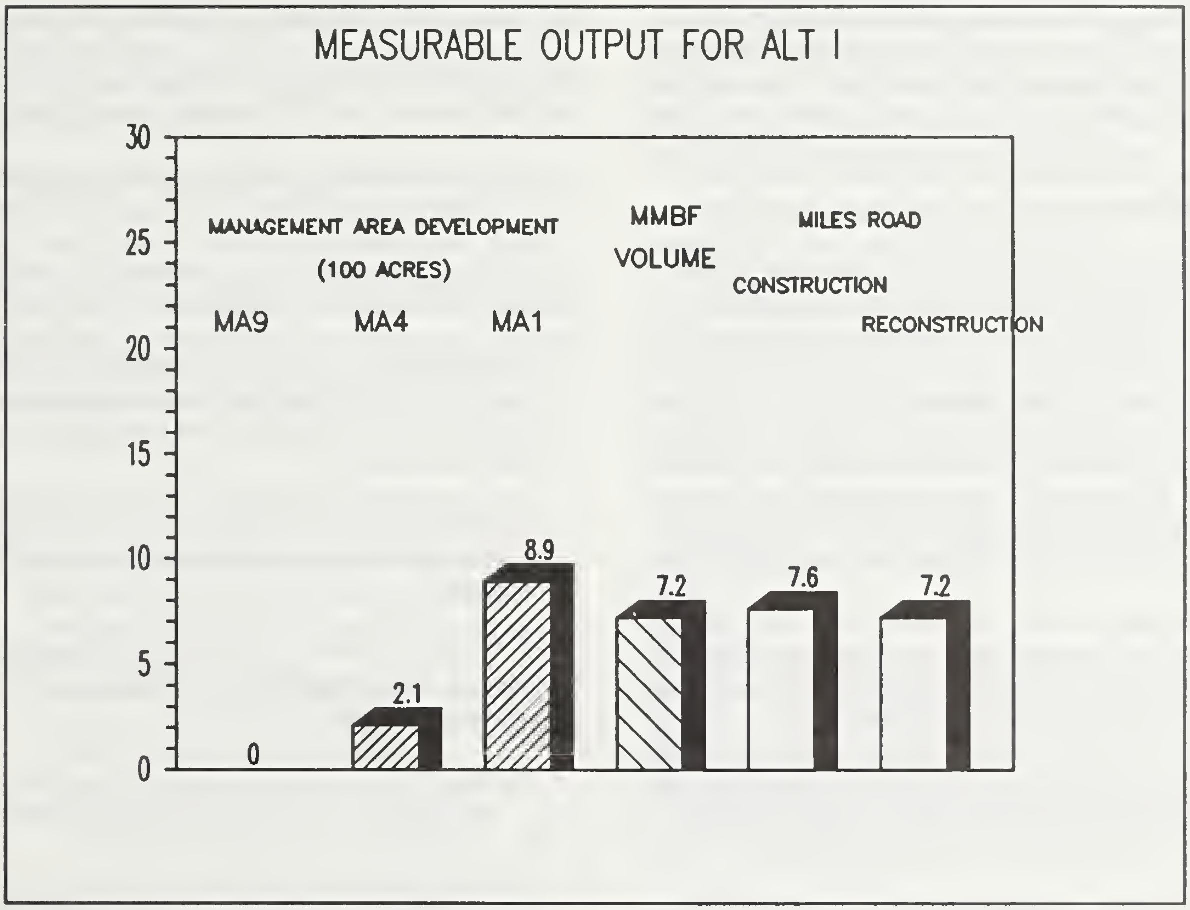


FIGURE 2-6

This chart shows the common measurable items of Acres Darvested in each Management Area, Million Board Feet (MMBF) of timber yield, and the Miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

***Specific Features*:**

Alternative I would harvest a total of 1105 acres. A total of 40 cutting units would be created. 85 acres would be clearcut and 280 acres would be seed tree harvested for a total of 365 acres of even-aged regeneration harvesting. 135 acres would be harvested using uneven-aged regeneration harvesting systems. 210 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 125 acres would be commercially thinned to promote growth. Sanitation salvage harvesting would be implemented on 270 acres to harvest dead, dying and high risk timber.

Access to treat these harvest units would require 7.6 miles of road construction and 7.2 miles of reconstruction. Three timber sales totaling 7.2 MMBF would be offered for sale.

Skidding methods include: 885 acres tractor skidding, 5 acres tractor/skyline swing, 50 acres helicopter yarding, and 165 acres skyline yarding. Slash disposal/site preparation will include 85 acres broadcast burning; 70 acres underburning; 210 acres of grapple piling and burning; and 740 acres of yarding tops, piling, and burning landings.

Even-aged reforestation consists of 145 acres natural regeneration and 220 acres of planting.

To provide browse areas within white-tailed deer winter range, 74 acres of seed tree harvesting units would be prescribed in the high risk lodgepole pine and white pine stands. Units would be limited to five acres in size, and would be grapple piled to reduce the risk of increasing unit size through broadcast burning. Seed trees would be retained for the entire rotation to provide snag recruitment. Harvest units would be located so existing and future old growth stands would not be fragmented.

All new roads would be closed under this alternative. Existing roads would be closed as needed to provide 70 percent security area for elk and Threatened and Endangered Species.

Old-growth recruitment stands would be designated to provide for five percent future old-growth within each old growth management unit.

Some timber would be harvested from riparian areas of tributaries to the Moyie River. Salvage/sanitation cutting would be used adjacent to 6800 feet of streamcourses, including about 3600 feet along a fork of Hellroaring Creek. Uneven-age management would be used in 800 linear feet of riparian area. Timber would be basal area and commercially thinned along 1700 feet of streamside area.

One tractor skid road stream crossing would be needed to log Unit 33. Road construction would require nine stream crossings, including one crossing of Bussard Creek.

Alternatives J1, J2, AND J2H

These alternatives were developed through the analysis process in response to objectives defined through public involvement. They represent a range of viewpoints that were expressed by an involved group of citizens. This group identified common objectives for incorporation into a single alternative which they felt they could all support.

The objectives developed at public meetings for the West Moyie Draft EIS (see project file) include:

1. Limit clearcutting to high risk stands where it is the only valid option.

2. Manage the area below 3,000 feet in elevation for white-tailed deer winter range.

3. Utilize shelterwoods where possible, keeping a portion of the overstory for an extended period of time to improve visual quality in sensitive areas.

4. Reduce road construction and skid longer distances where compatible with transportation systems.

5. Provide for 10 percent old growth (existing plus recruitment stands), by Old Growth Management Unit.

6. Roads
    a. Close new roads with barriers following completion of post-sale activities.

    b. Maintain existing open road system to provide for roaded primitive recreation opportunities.

    c. Explore options to handle dust problem on Meadow Creek Road.

    d. Seed roads to be closed, skid trails, and landings following completion of use.

7. Meet Forest Plan volume predictions for the Decision Area.

8. Enhance recreation opportunities.

9. Consult with the Beeline Water Association regarding water quality.

One commenter to the Draft EIS requested that we identify how the alternatives meet the above objectives. The following discussion identifies

objectives that were met with all of these alternatives.

The ID Team identified potential old growth recruitment stands in response to objective five above as discussed previously in Features Common to All Alternatives.

Members of the ID Team consulted with the Beeline Water Association. Information supplied by the water association enabled the IPNF forest hydrologist to consult with the Idaho Water Quality Bureau. Together they established a level of activity in the Upper Meadow Creek Drainage that would protect the water system and provide for the beneficial use of domestic water supply (Chapter 4, pages 4-28, 31, and 37.

Objectives concerning road management are discussed in other portions of this Final EIS.

- Features Common to all Alternatives states that skid trails, landings, and temporary roads will be seeded to ensure rapid vegetation (page 2-7).
- Alternative Maps identify roads to be closed. The only alternative that would result in closing of existing roads is Alternative I.
- Issues Not Analyzed In Detail (page 5-4 addresses the Meadow Creek Road.

The ID Team was not able to create a single alternative to meet the rest of these objectives. However, it did develop three alternatives (J1, J2, J2H) that meet the objectives to varying degrees. These alternatives demonstrate the effects and trade-offs in meeting as many of the citizen group's common objectives as possible. The descriptions for the three alternatives further discuss how these objectives would be met with each alternative.

Alternative J1

Purpose:
Alternative J1 was developed to demonstrate the lower level of timber volume necessary to meet the other identified objectives. It partially satisfies the identified purpose and need of this project.

Alternative J1 would supply some timber to area mills, but at a lower level than predicted by Forest Plan ground truthing. This lower level is due to maintaining thermal cover within the winter range area, and to limiting clearcutting to high risk lodgepole pine stands where that method is the only valid option. The objective of long-term sustained yield would be only partially met with this alternative. A balanced age class distribution would not be fully achieved and 80 percent of the high risk timber stands would not be treated.

Alternative J1 would provide some winter range browse for white-tailed deer. Thermal cover would be maintained. Harvest unit size would exceed the recommended 10 acres, but even-aged regeneration units in high risk lodgepole and white pine stands would be limited to 15 acres. These units would be underburned to promote browse production. Where underburning is not feasible, cedar reproduction would be encouraged. A cover/opening ratio of 80/20 would be developed over a rotation. Timing of logging operations would be managed to reduce disturbance to wintering deer.

Alternative J1 would leave about 4300 acres in an unroaded condition. This action would preclude consideration of the Hellroaring Roadless Area as part of the National Wilderness System. Sediment production and delivery under this alternative would be within Forest Plan and State of Idaho water quality standards.

Under Alternative J1, cutting units in visually sensitive areas would be designed to meet Forest Plan visual quality objectives. To further reduce the effects of harvesting on the visual resource within these areas, even-aged regeneration harvesting would use seedtree and shelterwood systems. These stands would be re-entered after regeneration is established to remove a portion of the overstory. The final overstory removal would not occur until the stand of regeneration has recovered to the point where past management activities are not noticeable (about 60 years). Under this alternative, timber would not be harvested on both sides of recreation trails.

This alternative would harvest 18 acres of potential old growth recruitment. Based on the HSI model interpretation, this alternative would have little or no impact upon wildlife species related to mature and old growth vegetation. It would have little or no effect on boreal owl. Suitable goshawk habitat

would be reduced but would be maintained at a level capable of supporting a nesting pair. Alternative J1 would have minimal effects on pine marten habitat in the Decision Area. However, increasing road densities could result in a greater risk of trapping mortality.

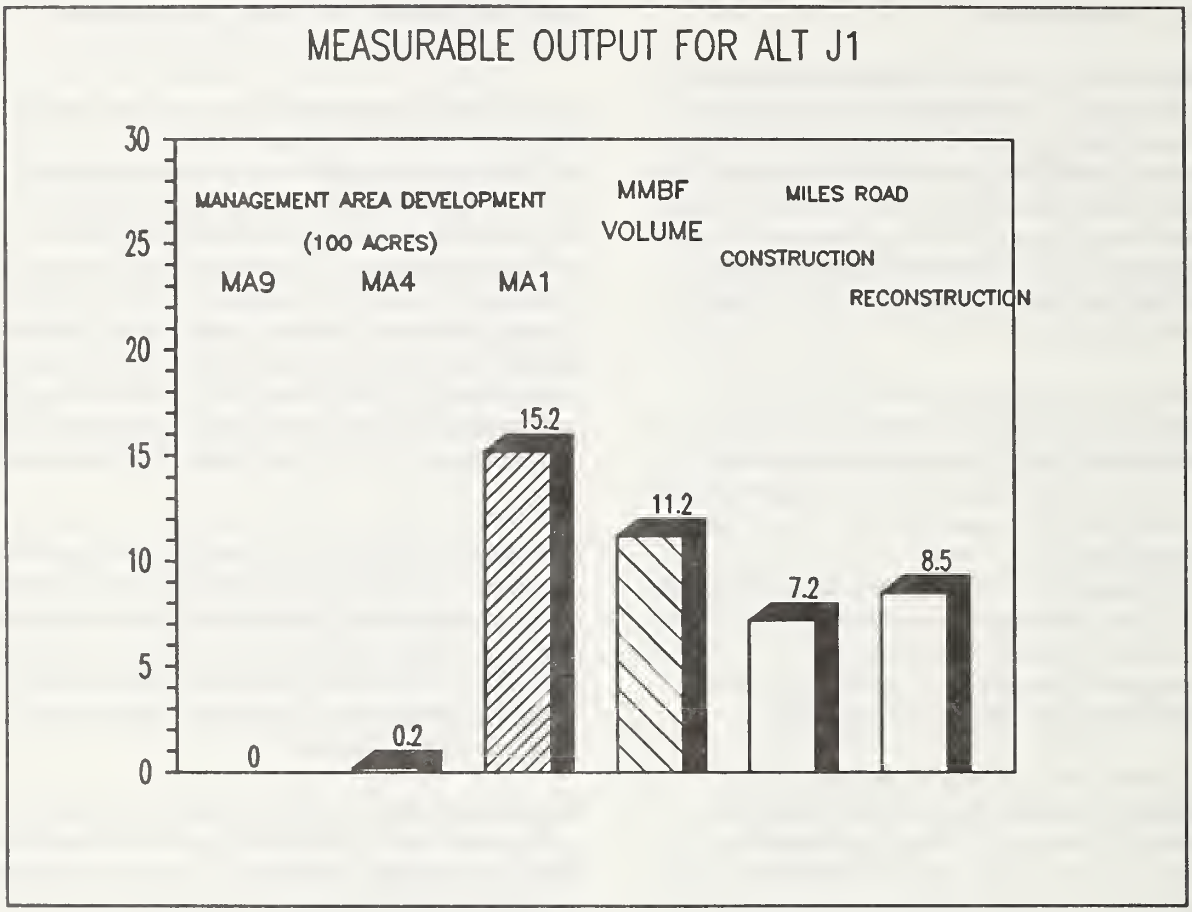


FIGURE 2-7

This chart shows the common measurable items of Acres Developed in each Management Area, Million Board Feet (MMBF) of timber yield, and the Miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

Specific Features:

Under Alternative J1, timber would be harvested from winter range areas using overstory removal, uneven-aged management, and salvage in white pine and lodgepole pine stands. A total of 1547 acres would be treated. A total of 44 cutting units would be created. 300 acres would be seed tree harvested and 160 acres would be shelterwood harvested for a total of 460 acres of even-aged regeneration harvesting. 40 acres would be harvested using uneven-aged regeneration systems. The overstory would be removed on 90 acres. 567 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 125 acres would be commercially thinned to promote growth. Sanitation salvage harvesting would be implemented on 265 acres to harvest dead, dying and high risk timber.

Some timber would be cut in riparian areas. Timber would be removed using a salvage/sanitation system from 6400 feet of streamside area. Uneven-age management system would be used to harvest timber in 800 linear feet of riparian area. One skid road stream crossing would be needed to log Unit 33. New road construction would require 10 stream crossings, including two crossings of Bussard Creek.

Under Alternative J1, the transportation system would be designed to use long skidding distances, thereby decreasing the amount of road construction needed. Access to treat harvest units would require 7.2 miles of road construction, 4.9 miles less than the initial proposed action, and 8.5 miles of reconstruction. All new roads would be gated untill post sale activities have been completed. Once these activities have been completed, the gates would be replaced with barriers and the road seeded.

Three timber sales totaling 11.2 MMBF would be offered. Sales that fall within winter range areas would be subdivided, with operations restricted to one subdivision at a time to avoid disturbing wintering deer.

Skidding methods include: 1415 acres tractor skidding and 132 acres skyline yarding. Slash disposal/site preparation will include 202 acres underburning; 258 acres of grapple piling and burning; and 1087 acres of yarding tops, piling, and burning landings.

Even-aged reforestation consists of 363 acres natural regeneration and 107 acres of planting.

Alternative J2

Purpose:
This alternative was also designed to meet some of the objectives developed at public meetings for the West Moyie Draft EIS. It assesses the trade-offs between meeting Forest Plan harvest acreage predictions and the following public working group objectives:

#1. Limit clearcutting to high risk stands where it is the only valid option.

#2. Manage the area below 3,000 feet in elevation for white-tailed deer winter range.

#8. Enhance recreation opportunities

This alternative partially satisifies the purpose and need. It would provide timber for area sawmills and move the Decision Area toward a more balanced age class distribution. Some high risk stands would be harvested under this alternative, but 80 percent of these stands would not be treated. Alternative J2 would also provide a significant amount of winter range forage; however, thermal cover would be insufficient to fully utilize the winter range. In addition, the harvest unit sizes in the winter range would exceed the recommended ten acres.

Alternative J2 would leave about 3100 acres in the roadless category. This action would eliminate the opportunity to include the Hellroaring Roadless Area in the National Wilderness Preservation System.

Sedimentation due to road construction and logging would increase under this alternative, but water quality objectives of the Forest Plan and State of Idaho would still be met.

Alternative J2 would meet visual quality objectives of the Forest Plan. Recreation opportunities would be somewhat protected, as shelterwood systems would be used in even-aged management adjacent to trails; but logging would occur on both sides of some trails. Final overstory removal from seedtree and shelterwood units in visually sensitive areas would not be done until regeneration is recovered to the point that past management activities are not noticeable (about 60 years).

Alternative J2 would result in the construction of a road through an existing old growth stand in the East Fork of Meadow Creek, resulting in the fragmentation of nine acres of old growth. In addition, 18 acres of potential old growth recruitment stands would be harvested. It would further reduce boreal owl nesting habitat below the threshold level determined necessary to maintain a local population, until recruitment old growth stands mature. Based on the HSI model interpretation, proposed actions under this alternative would make the entire Decision Area unsuitable as

goshawk habitat, and would therefore not meet regional recommendations for maintaining viable goshawk populations (USDA Forest Service, 1989c). Alternative J2 would have minimal effects on pine marten habitat. Increased road densities could result in higher trapping mortality of this species.

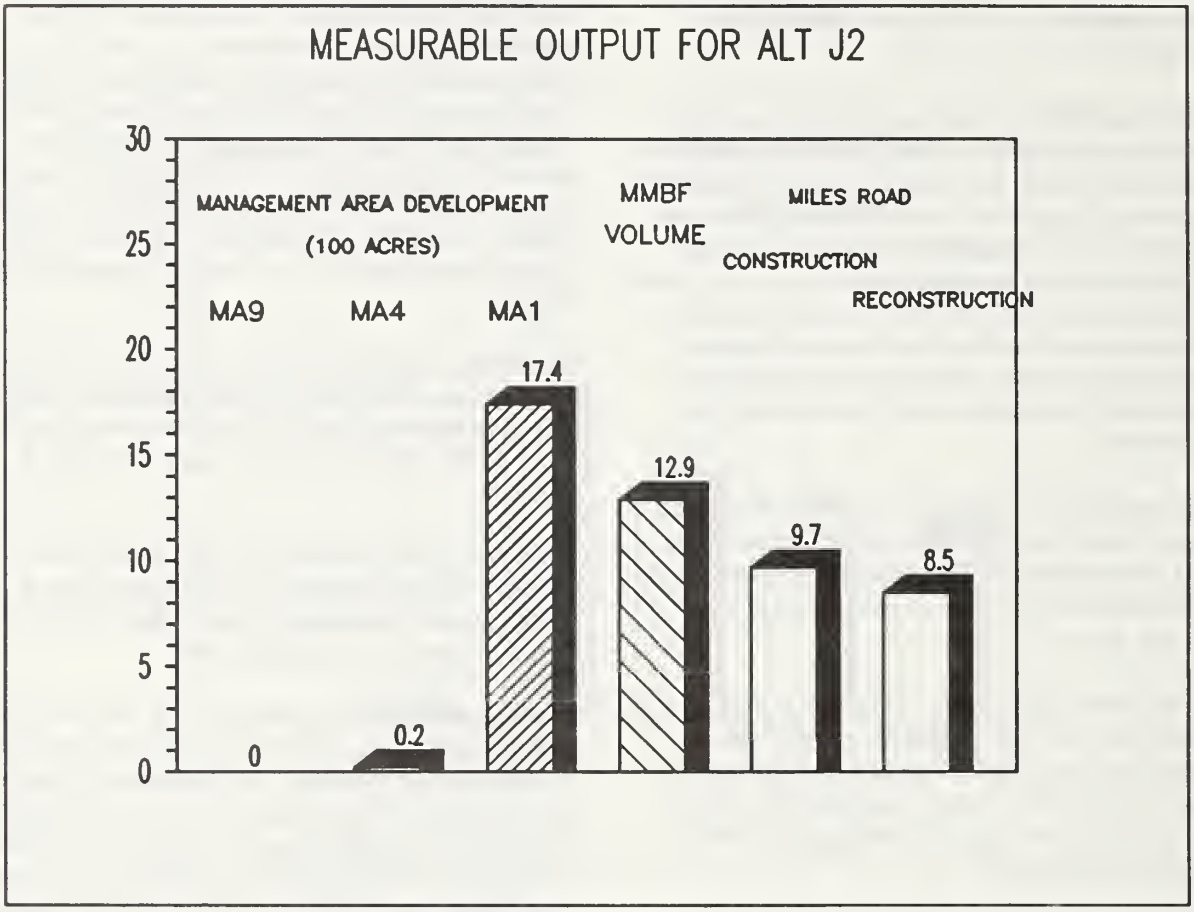


FIGURE 2-8

This chart shows the common measurable items of Acres Developed in each Management Area, Million Board Feet (MMBF) of timber yield, and the Miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

Specific Features:

This alternative was designed using Alternative J1 as a base. Changes to Alternative J1 are highlighted below.

- To provide browse areas within white-tailed deer winter range, even-aged regeneration harvesting units are prescribed in the high risk lodgepole pine and white pine stands. These units were increased to a maximum

size of 20 acres, increasing the amount of regeneration harvesting within the winter range area by 77 acres.

- The amount of intermediate harvesting has been increased by 55 acres.

- Timber harvest would occur on both sides of trails. This would require the crossing of trails with skidding equipment in five harvest units. Even-aged regeneration harvest units located adjacent to trails would be treated with shelterwood systems where feasible.

- Clearcutting was prescribed for other than high risk lodgepole pine stands where it appeared to be the only valid regeneration harvest option. This applies primarily to spruce/fir stands, which are highly susceptible to windthrow if partial cut. This action would reduce brush invasion since site preparation could be effectively completed. Two to three fire-resistant trees per acre will be left within these units.

Alternative J2 would harvest a total of 1767 acres. A total of 52 cutting units would be created. 75 acres would be clearcut, 325 acres would be seed tree harvested and 200 acres would be shelterwood harvested for a total of 600 acres of even-aged regeneration harvesting. 40 acres would be harvested using uneven-aged regeneration systems. The overstory would be removed on 115 acres. 597 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 125 acres would be commercially thinned to promote growth. Sanitation/salvage cutting would be implemented on 290 acres to harvest dead, dying and high risk timber.

Access to treat these harvest units would require 9.7 miles of road construction, 2.4 miles less than the initial proposed action, and 8.5 miles of reconstruction. All new roads would be gated untill post sale activities have been completed. Once these activities have been completed, the gates would be replaced with barriers and the road seeded. Three timber sales totaling 12.9 MMBF would be offered for sale.

Some timber would be cut and removed from riparian areas adjacent to tributaries of the Moyie River. Clearcutting would occur on both sides of 800 feet of the upper reaches of Wall Creek. 800 linear feet of riparian zones would be impacted by uneven-age management, and 11200 feet by salvage sanitation cutting. A skid road creek crossing would be needed to log Unit 33. Road construction would require 12 new stream crossings, including two crossings of Bussard Creek.

Skidding methods include 1635 acres tractor skidding and 132 acres skyline yarding. Slash disposal/site preparation will include 45 acres of broadcast burning,;217 acres underburning; 338 acres of grapple piling and burning; and 1167 acres of yarding tops, piling, and burning landings.

Even-aged reforestation consists of 423 acres natural regeneration and 197 acres of planting.

Alternative J2H

(Alternative J2 with Helicopter Option Added)

Purpose:
Alternative J2H assesses the trade-offs between meeting the involved citizens' group objectives and Forest Plan ground truthing timber volume predictions. It is identical to Alternative J2 with the exception of an additional 1206 acres of helicopter logging in the inaccessible pine stands. This helicopter option was added to Alternative J2 to demonstrate the cumulative effects of the helicopter harvesting option when added to another alternative. The difference in effects between Alternatives J2 and J2H are due entirely to the helicopter option. This helicopter option could be added to any of the action alternatives considered

All inaccessable areas were analyzed for inclusion in the helicopter portion of this alternative. Only those stands that contained high risk lodgepole pine and white pine were actually included.

This alternative partially satisifies the stated purpose and need. It would provide a substantial amount of timber to area sawmills and would move the Decision Area towards a more balanced age class distribution, thereby making progress toward long-term sustained yield of forest products. About 58 percent of the high risk stands would be treated under this alternative. This activity would salvage timber that otherwise would be lost in some stands and basal area thin other stands to reduce the lodgepole pine susceptibility to mountain pine beetle infestation. Alternative J2H would also provide a great deal of winter range forage. However, it would not provide adequate cover for white tailed deer to fully utilize the winter range area.

Alternative J2H would leave virtually no area in the roadless category. Thus, the opportunity for including the Hellroaring Roadless Area into the National Wilderness Preservation System would be lost.

Alternative J2H would increase sediment production and distribution to area streams. However, this increase would still meet water quality standards of the Forest Plan and the State of Idaho. Forest Plan visual quality objectives would also be met under this alternative.

Alternative J2H would result in the construction of a road through an existing old growth stand in the East Fork of Meadow Creek, resulting in the fragmentation of nine acres of old growth. In addition, 18 acres of potential old growth recruitment stands would be harvested. Until the potential old growth recruitment stands mature, boreal owl nesting habitat would be further reduced below the level necessary to maintain a local population of owls. Based on the HSI model interpretation, Alternative J2H would make the entire Decision Area unsuitable as goshawk habitat. Effects on pine marten cover would be minimal; however, increased road densities would result in a greater risk of trapping mortality.

Specific Features:
Alternative J2H would harvest a total of 2973 acres. A total of 66 cutting units would be created. 75 acres would be clearcut, 325 acres would be seed tree harvested and 270 acres would be shelterwood harvested for a total of 670 acres of even-aged regeneration harvesting. 40 acres would be harvested using uneven-aged regeneration systems.

The overstory would be removed on 164 acres. 719 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 293 acres would be commercially thinned to promote growth. Sanitation salvage harvesting would be implemented on 1087 acres to harvest dead, dying and high risk timber.

Access to treat these harvest units would require 9.7 miles of road construction and 8.5 miles of reconstruction. Four timber sales totaling 19.3 MMBF would be offered for sale.

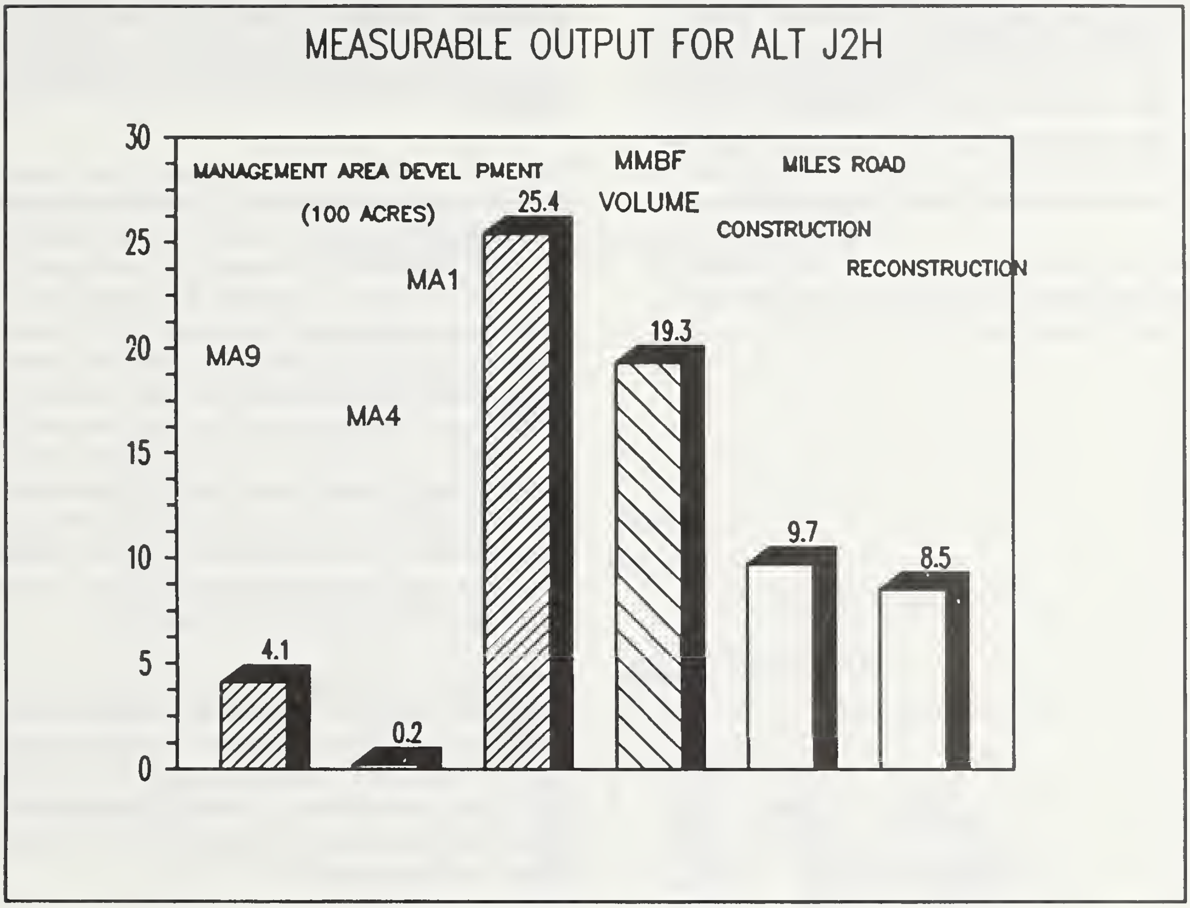


FIGURE 2-9

This chart shows the common measurable items of Acres Developed in each Management Area, Million Board Feet (MMBF) of timber yield, and the Miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

Skidding methods include 1635 acres tractor skidding, 132 acres skyline yarding, and 1206 acres of helicopter yarding. Slash disposal/site preparation will include 45 acres of broadcast burning; 217 acres underburning; 338 acres of grapple piling and burning; and 1167 acres of yarding tops, piling, and burning landings.

Even-aged reforestation consists of 493 acres natural regeneration and 197 acres of planting.

Timber would be cut in several riparian areas adjacent to tributaries of the Moyie River. Extensive salvage/sanitation harvesting, amounting to 44,600 feet along streamcourses, would be done in these

riparian zones. This would include harvesting 3600 feet in the upper reaches of Hellroaring Creek, 3200 feet in the Queen Lake fork of Bussard Creek, and 9200 feet along Rutledge Creek. Uneven-aged management would remove timber from about 800 linear feet of riparian area. 7,400 linear feet would undergo commercial thinning. Shelterwood harvesting would occur along 2000 linear feet of riparian area. Clearcutting would occur adjacent to 800 feet of upper Wall Creek.

A skid road stream crossing would be needed to log Unit 33. Road construction would require 11 new stream crossings.

Alternative K
The Preferred Alternative

Purpose:
Alternative K was developed in response to public comment on the Draft EIS. Primary comments which drove the development of this alternative were:
- visual quality
- water quality
- timber supply for area mills
- mountain pine beetle infestation risk
- protection of the trail systems
- wildlife habitat, primarily goshawk, boreal owl, and winter range.

These issues are listed in order from the one generating the most public comments, to the least.

Alternative K would supply timber to area mills at a level near that predicted by Forest Plan ground truthing. The objective of long-term sustained yield would be partially met with this alternative. A balanced age class distribution would not be fully achieved at this point. The primary objective for identifying harvest units was high risk timber. 43 percent of the high risk timber stands would be treated, reducing the risk of a mountain pine beetle epidemic.

Alternative K would provide some winter range browse for white-tailed deer. Thermal cover would be maintained. Harvest unit size would exceed the recommended 10 acres, but even-aged regeneration units in high risk lodgepole and white pine stands would be limited to 20 acres. Stands that currently provide high value winter range cover would be managed with uneven-aged prescriptions designed to maintain cover within the stand. To provide for the desirable cover/ opening ratio of 80/20 over time, the conversion period for these stands would be extended as recommeded in recent papers (Jageman, 1984). Timing of logging operations would be managed to reduce disturbance to wintering deer.

Alternative K would leave about 2000 acres in an unroaded condition. This action would preclude consideration of the Hellroaring Roadless Area as part of the National Wilderness System. Sediment production and delivery under this alternative would be within Forest Plan and State of Idaho water quality standards.

Under Alternative K, cutting units in visually sensitive areas would be designed to meet Forest Plan Visual Quality Objectives. There would be no clearcutting with this alternative. To further reduce the effects of harvesting on the visual resource within visually sensitive areas, even-aged regeneration harvesting would consist of shelterwood systems. After regeneration is established, these stands would be re-entered to remove a portion of the overstory. The final overstory removal would not occur until the stand of regeneration has grown to the point where past management activities are not noticeable (about 60 years).

Alternative K would result in the construction of a road through an existing old growth stand in the East Fork of Meadow Creek, resulting in the fragmentation of nine acres of old growth. Based on the HSI model interpretation, this alternative would have little if any impact upon wildlife species

related to mature and old growth vegetation. It would have little effect on boreal owl. The conversion time for stands harvested with the group selection form of uneven aged management would be extended to maintain the proper balance of mature timber for nesting habitat. Suitable goshawk habitat would be reduced but would be maintained at a level capable of supporting a nesting pair. Alternative K would have minor effects on pine marten habitat in the Decision Area. However, increasing road densities could result in a greater risk of trapping mortality.

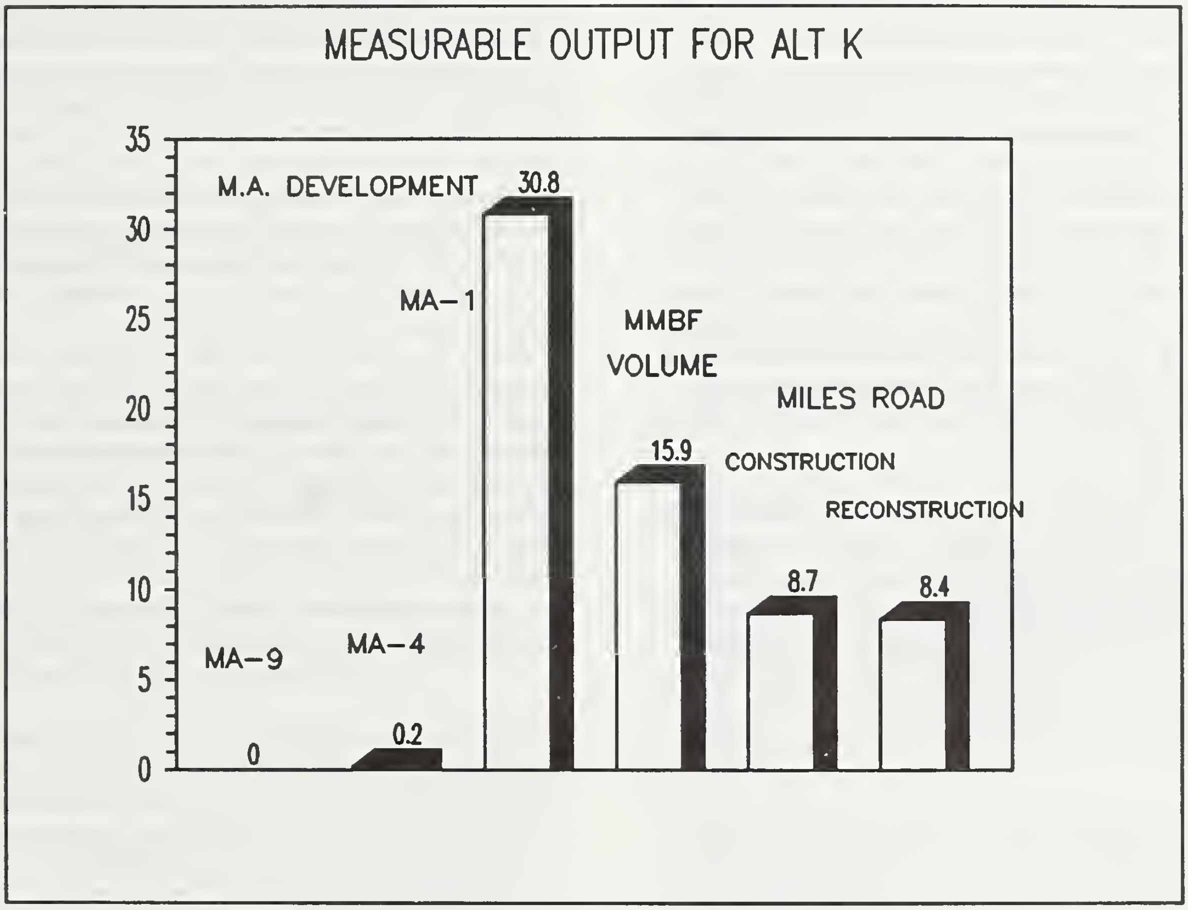


FIGURE 2-10
This chart shows the common measurable items of Acres Developed in each Management Area, Million Board Feet (MMBF) of timber yield, and the Miles of road construction and reconstruction. Management Area 1 (MA1) primary goal is timber production. MA4 primary goals are big game winter range and timber production. MA9 is primarily established to maintain the existing resources on lands non-suitable for timber production.

***Specific Features*:**
A portion of the helicopter option presented with Alternative J2H is included in this alternative. Two helicopter units in mixed conifer/pine stands in lower Bussard Creek were dropped from the helicopter option to provide protection to potential

high value goshawk nesting stands. The lower portion of helicopter unit 147 was dropped due to high goshawk feeding values.

Under Alternative K, a total of 3098 acres would be treated. A total of 63 cutting units would be created. 140 acres would be seed tree harvested and 273 acres would be shelterwood harvested, for a total of 413 acres of even-aged regeneration harvesting. Forty acres would be harvested using single tree selection uneven-aged regeneration systems. 777 acres would be harvested using group selection form of uneven-aged regeneration system, for an actual harvest area of 78 acres. Sanitation salvage will be implemented between the groups on 181 acres in stands where the group selection system is prescribed. 717 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 491 acres would be commercially thinned to promote growth. The overstory would be harvested on 49 acres. Sanitation salvage harvesting would be implemented on 611 acres to harvest dead, dying and high-risk timber.

Some timber would be cut in riparian areas. Timber would be removed using a salvage/sanitation system from 34,400 feet of streamside area. Uneven-age management system would be used to harvest timber in 800 linear feet of riparian area. Shelterwood harvest would occur along 2,000 linear feet and commercial thinning would take place along 7,400 linear feet. One skid road stream crossing would be needed to log Unit 33. New road construction would require 13 stream crossings, including two crossings of Bussard Creek.

Under Alternative K, the transportation system would be designed to use long skidding distances, thereby decreasing the amount of road construction needed. Access to treat harvest units would require 8.7 miles of road construction and 8.4 miles of reconstruction.

Four timber sales totaling 15.9 MMBF would be offered. Sales that fall within winter range areas would be subdivided, with operations restricted to one subdivision at a time to avoid disturbing wintering deer.

Skidding methods include: 2214 acres tractor skidding, 102 acres skyline yarding, and 782 acres helicopter yarding. Slash disposal/site preparation will include 344 acres of grapple piling and burning; and 1679 acres of yarding tops, piling, and burning landings.

Even-aged reforestation consists of 328 acres natural regeneration and 85 acres of planting.

Monitoring Effects of Selected Alternative

Forest Plan Monitoring

The Idaho Panhandle National Forest has developed a plan to monitor the implementation of the Forest Plan, monitor the effectiveness of management practices implemented under the Forest Plan, and validate the assumptions and models used in planning. The Forest prepares a Forest Plan Monitoring and Evaluation Report on an annual basis to document the results of this monitoring. The latest such report was released in May, 1990. This report documented the monitoring for 1989 (USDA Forest Service, 1990). Forest Plan monitoring done for the Bonners Ferry Ranger District to address issues pertinent to the Decision Area include:

Water Quality - Forest Plan Appendix JJ established the IPNF water quality monitoring program. The water quality monitoring program is the result of a Memorandum of Understanding dated September 19, 1988, as agreed to with the State of Idaho. The agreement also replaced Forest Plan Appendix S (Best Management Practices) with Forest Service Handbook 2509.22 (Soil and Water Conservation Practice Handbook). See Appendix C for a discussion of the Soil and Water Conservation Practices applicable to West Moyie.

Appendix JJ of the Forest Plan established that in order to demonstrate water quality protection, the implementation of monitoring plans will address three primary questions:

1. Are BMPs implemented as designed?
2. Are the BMP's effective in controlling nonpoint sources of pollution?
3. Are beneficial uses of water protected?

To provide answers to these questions, the following monitoring categories will be utilized:

Baseline monitoring characterizes existing water quality conditions and long-term trends of stream systems. It also provides a control for monitoring and assessing activities. Baseline monitoring sites throughout the Forest have been identified and established to representatively sample conditions on the Forest.

Implementation monitoring shows whether or not prescribed BMPs were implemented as designed and in accordance with Forest/ Project Plan standards and guidelines. The predominant form of Forest/Project plan monitoring will focus on implementation. In addition to the specific project monitoring discussed later, supplemental implementation monitoring will include internal field reviews by interdisciplinary teams using a procedure similar to the state audits.

The specific project to be monitored will be selected based on local issues and BMPs used. Projects of each type of land management activity and a target of 10 percent of timber sales will be evaluated per year. The primary objective will be to determine if BMPs identified in the Forest/Project plan were implemented and correctly applied in a timely fashion. During the review, visual observations will be made to see if BMPs and Forest/Project plan standards and guidelines are effective

In the event of incorrect or inappropriate application of BMPs, or omission of prescribed BMPs, causes will be identified along with corrective or preventive actions to be taken. Corrective measures will be incorporated into:
1) modification of and adjustment to contracts;
2) administrative procedures; and
3) long range plans as necessary to ensure BMPs are both properly designed and implemented.

Effectiveness monitoring demonstrates if BMPs were effective in controlling pollutants to planned levels or resource management objectives. The intent is to focus on cause and effect relationships between land management activities and water quality. This monitoring will be done on a sample basis to characterize typical conditions so that results can be extrapolated. Emphasis will be on major nonpoint source (NPS) contributing activities such as road construction, reconstruction, and maintenance; related erosion control BMPs; and riparian area management.

Visual Quality - Decision documents are reviewed annually for Forest Plan visual quality objective compliance. Annually, up to two sales per district

may be field reviewed after harvesting has been completed. The objective of the field review is to determine if the VQO's have actually been met as disclosed by the decision document for that sale. A ten percent departure from Forest Plan direction after five years would initiate further evaluation of the visual resource management program.

Wildlife - Management indicator species (big game) population trends are determined by the State of Idaho Dept. of Fish and Game. Hunter success rates and visual counts of animals are used to determine these population levels.

Goshawk nesting sites are being monitored forest wide. Known nesting sites are being visually inspected to determine occupancy, the monitoring frequency varies based on funding. Surveys are conducted for additional nesting sites during project planning.

Timber Management - Forest level monitoring to track implementation of the Forest wide timber management program includes:

- Tracking of regeneration status on harvested lands to determine if restocking is completed within five years.
- Surveying to determine insect and disease levels and potential for major outbreaks.
- Accumulate and maintain data on timberland suitability changes recommended by project level planning.
- Accumulate and maintain data on timber sell levels (actual area and volume sold compared to the Forest Plan predicted levels).

Cultural Resources - Field monitoring is done by ranger districts to measure potential impacts of land-disturbing projects on known cultural resources. Areas are surveyed prior to project implementation, and site-specific plans are developed to protect new sites.

Threatened, Endangered, and Sensitive Plants - IPNF direction is to inventory and manage sensitive plants so that no new species has to be listed as threatened or endangered. Projects are therefore surveyed and modified to attain this objective. Sensitive plants are protected according to site specific management plans.

Soils - IPNF standard is to maintain 80 percent of an activity area in a productive condition for growing trees and other managed vegetation. To help meet this direction, one sale per year on each district is monitored. Recommendations stemming from this monitoring and evaluation are made to the project being monitored and to forest practices in general.

Insects and Disease - Aerial surveys are conducted annually on the IPNF to indicate locations and severity of insect problems. In addition, a forest pest conditions report is prepared. IPNF direction is to keep serious pest problems to less than five percent of the Forest.

Project Monitoring

In addition to the Forest Plan monitoring, monitoring is conducted on specific projects to insure that implementation is consistent with the established standards and guidelines. Monitoring is also conducted to determine the effectiveness of management activities and applied mitigation measures. Specific monitoring developed for this project includes:

Implementation

Water Quality - Timber sale administrator will monitor the implementation of applicable BMP's and mitigation measures (site specific BMP's). This will be documented with BMP inspection reports. The completed reports will be given to the forest hydrologist, who will compile them from all districts and forward them to the State Bureau of Water Quality on an annual basis.

Timber Management - Timber sale layout will be reviewed by the district management team to determine compliance with established goals and standards prior to sale award.

Timber sale administrator will visit each active harvest unit at a frequency necessary to assure compliance with timber sale contract.

Minor contract changes or contract modifications will be enacted, when necessary, to meet objectives and standards on the ground.

Cultural Resources - Roads constructed through units 1, 10, and 12 will be inspected by the district archeologist during the construction phase to verify the cultural clearance. The purpose of this inspection will be to determine if these areas contain prehistoric sites. A model has been developed to predict the potential for locating prehistoric sites within the Moyie River valley. This model identified these units as locations where there is a high probability of finding prehistoric sites. If the predictions are correct, special contract provision "C6.24# Protection of Cultural Resources" will be used to provide protection for the sites.

Effectiveness

Water Quality - Upper Meadow Creek, Hellroaring Creek, and Bussard Creek will be surveyed prior to timber harvest and following timber harvest for the first two years following snow melt after harvest and at three year intervals or major flood events thereafter untill hydrologic recovery has occurred.

The survey will consist of:

Channel geometry measurements and substrate particle size sampling will be used to quantify riffle stability. This will constitute Pollutant Source and Transport (PST) monitoring. Residual pool depth will be sampled in adjacent downstream pools to determine effects on beneficial use (fish rearing and overwintering habitat).

For each reach of the streams identified in the stream channel condition survey (see project files), three riffles and three downstream pools would be sampled. This sample would take approximately 4 man-days for Upper Meadow Creek, 3 man-days for Hellroaring, and 2 man-days for Bussard Creek. The sample prior to timber harvest would be financed with Forest Plan Water Quality monitoring appropriations. The post harvest monitoring would be financed with KV dollors to the degree possible.

Upper Meadow Creek: As required by state law, the Beeline Water Association monitors the turbidity in the public water system on a daily basis. The district hydrologist will obtain copies of the turbidity reports to compare with the modeled predictions.

Timber Management - Units that are treated with a regeneration type harvest (clearcut, seedtree, shelterwood, or uneven-aged management) will be surveyed to determine regeneration success as follows:

Artificial regeneration - stands will be surveyed at one, two, three, and five years following planting to determine certification of regeneration. (KV-funding assured through timber sale base rates to comply with NFMA).

Natural regeneration - stands will be surveyed at two, four, and five years following site preparation to determine certification of regeneration (KV-funding assured through timber sale base rates to comply with NFMA).

Units treated with intermediate type of harvests (thinning and sanition salvage) will be surveyed following completion of harvesting. This survey will assess stand condition and determine if harvest objectives were met.

Wildlife - District Road Management coordinator will monitor the timing and effectiveness of road closures and maintain closure structures.

Ten percent of the harvested area will be surveyed following harvest to determine compliance with snag management quidelines.

Alternatives Considered but not Given Detailed Study

Several preliminary alternatives identified during early ID Team meetings were not fully developed because they were not feasible or because they were similar to other alternatives. Four alternatives were considered but eliminated from detailed analysis. These are briefly presented here along with the rationale for dropping them from further analysis.

Alternative B1

This alternative was designed to provide the greatest short term timber yield. Preliminary analysis of the effects of the proposed cutting units revealed that harvesting proposed by this alternative would reduce old-growth habitat in old-growth management units below Forest Plan levels required by NFMA to sustain a viable population of old-growth indicator species. In addition it was felt that the impact to the public water supply in Upper Meadow Creek would not be within state laws and Forest Plan Standards.

It was determined since this alternative was not consistant with state laws, NFMA, and Forest Plan requirements, the alternative would be dropped. This alternative did serve as the basis for Alternative B2.

Alternative B2 was developed from Alternative B1 by deleting three units in the Queen Mountain area and one unit south of McDougal Creek to eliminate impacts to old growth habitat. The proposed road system in Upper Meadow Creek was modified to reduce impacts to the public water system.

Maps and descriptions of this alternative can be found in the project file.

Alternative C

This alternative was designed to closely parallel Forest Plan ground truthing timber output projections. The objective was to continue harvesting in second growth sawtimber and high risk lodgepole pine and white pine stands to obtain an age class distribution that would allow for a sustainable timber yield from the area. Harvest units were designed to meet Forest Plan Visual Quality Objectives, water quality/fisheries standards, and old growth standards.

The alternative did impact recreation in the form of eliminating additional trail mileage through road construction and cutting unit location.

Alternative H was later developed with the same basic criteria but with more emphasis on protecting existing recreation facilities and providing for the future opportunity to develop additional recreation facilities. The outputs of Alternatives C and H were compared by the ID Team. The team determined the differences to be insignificant and decided to drop Alternative C from further consideration.

Maps and descriptions of this alternative can be found in the project file.

Alternative F

The objective of this alternative was to provide approximately 7500 acres of roadless area while providing minimal timber outputs from the roadless area. Alternative D provides minimal timber outputs from the roadless area while maintaining sufficient roadless acreage to maintain the option for Congress to add this roadless area to the wilderness preservation system. This was not a design objective of Alternative D, but was met by it nonetheless. Therefore Alternative F was dropped from detailed consideration.

Maps and description of this alternative can be found in the project file.

Alternative G

The objective of this alternative was to retain approximately 5000 acres of roadless area while providing minimal timber outputs from the roadless area. There was little difference between Alternatives D, E, F, and G. Alternatives D and E provide the roadless values needed to maintain the wilderness option; therefore, Alternative G has been dropped from detailed consideration.

Maps and descriptions of this alternative can be found in the project file.

Wilderness Recommendation Alternative

One respondent to the Draft EIS requested that we consider an alternative to recommend the Hellroaring Roadless Area for inclusion in the National Wilderness Preservation System. The ID Team considered this comment but decided not to present a wilderness recommendation alternative

in detail because it would represent a repetitive discussion of Alternative 3 previously considered in the FEIS accompanying the Forest Plan. In order to avoid repetitive discussions and excessive paperwork, the West Moyie FEIS is tiered to the evaluation in the Idaho Panhandle Forest Plan EIS.

The administrative procedures for evaluating possible Wilderness recommendations are separate from the procedures employed to consider specific land management activities. As defined by 36 CFR 219 Part 219, possible wilderness recommendations are evaluated during the forest planning process. According to these regulations, the Forest Service determines the general, programmatic management direction for each National Forest during the initial development and subsequent revision of Forest Plans. The Forest Plan stage of decision-making includes the designation of Management Areas that provide management emphases for various sub-areas of the Forest. It is during this programmatic step in the Forest Service's decision-making process that the agency determines which lands to recommend to Congress for inclusion in the National Wilderness Preservation System.

The FEIS accompanying the Forest Plan documents the Forest Service's consideration of a wilderness recommendation alternative for the Hellroaring Roadless Area (FEIS FP pages C-1 and DEIS FP pages C-69 to C-79). The Forest Plan FEIS includes a description of the wilderness features of this area, and an analysis of several alternative management emphases and the associated environmental consequences.

Based on an evaluation of this information, the Regional Forester made a decision on which areas to recommend to Congress for inclusion in the National Wilderness Preservation System. Congress was notified of the Regional Forester's wilderness recommendations and non-wilderness allocations for roadless areas when the Record of Decision selecting the Forest Plan was completed in September of 1987. The Hellroaring Roadless Area was not recommended for inclusion in the National Wilderness Preservation System.

The Hellroaring Roadless Area #1-128 has not been identified for wilderness designation in any of the wilderness bills prepared to date. No other proposals recommending wilderness designation have been identified, including Alternative W to the Forest Plan, as proposed by several environmental organizations.

The Forest Plan will be revised at least every 15 years, maybe sooner. When the Plan is revised, the Forest Service will again evaluate all existing roadless lands for possible recommendation to Congress for inclusion in the National Wilderness Preservation System. This systematic process is designed to periodically provide Congress with information on Forest Service management goals for roadless areas, including wilderness recommendations and areas where the management emphases allow development activities.

At the project level stage of Forest Service decision-making, the issues and concerns focus on the environmental and managerial consequences of specific proposed activities and alternative methods of accomplishing the purpose and need of the specific proposal. The focus of decision-making at this stage is not the programmatic land management objectives for large areas of the Forest; rather, it is whether and how to conduct specific proposed activities.

These "staged" decision-making procedures are designed to fulfill the National Environmental Policy Act's direction that agencies "utilize a systematic, interdisciplinary" approach to environmental decision-making. Furthermore, these procedures are consistent with Council on Environmental Quality's regulations implementing NEPA, which state:

> "Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions on the same issues and to focus on the actual issues ripe for decision at each level of environmental review (1508.28). Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues discussed in the broader statement and

incorporate discussions from the broader statement by reference and shall concentrate on issues specific to the subsequent action." 40 CFR 1502.20

The reassessment of Forest Plan Management Area designations (including those for roadless areas) during the analysis of every individual proposed action would negate the orderly and systematic procedures outlined in 36 CFR Part 219 and the CEQ requlations.

The Draft EIS and Final EIS for the West Moyie proposal are consistent with the Chief's August 15, 1988, decision regarding the adequacy of the IPNF Forest Plan roadless analysis. Both documents consider in detail a "no action" alternative (Alternative A) and one action alternative (Alternative E) that would avoid impacts to the roadless characteristics of the Hellroaring #1-128 Roadless Area. Both also include one alternative (Alternative D) that would involve road construction and timber harvesting in portions of the Hellroaring roadless area while preserving sufficient acreage to maintain the option for Congress to include the remaining roadless area in the National Wilderness Preservation System.

Alternatives are also described that would involve road construction and timber harvesting to the degree that the option to include any portion of the roadless area in the National Wilderness Preservation System would be foregone. Chapter 3 of the DEIS and FEIS describes the existing roadless values and wilderness features of this area. Chapter 4 of the DEIS and FEIS describe the direct, indirect, and cumulative impacts of the proposed action and alternatives on all resources that may be significantly affected, including the roadless resource. The information in Chapters 3 and 4 tiers from and incorporates by reference information presented in the Forest Plan EIS. Prior to making a decision on which alternative to implement, the decision maker will weigh the consequences of the alternatives against the purpose and need of the proposal.

The alternative suggested by this commenter is the same as Alternatives A and E, except for the administrative act of asking the Secretary of Agriculture to recommend to Congress that the Hellroaring Roadless Area be designated as part of the National Wilderness Preservation System. An analysis of the environmental impacts of a wilderness recommendation alternative would be redundant to the impacts disclosed for these two alternatives.

Finally, detailed consideration of a wilderness recommendation alternative would not achieve the purpose of the proposed action. The proposed action addressed in this EIS is not a programmatic proposal on how to manage the roadless area. Rather, the EIS addresses a proposal of specific activities. Thus, the general, programmatic management emphasis of this roadless area, including whether it should be recommended to Congress for Wilderness designation, is outside the scope of the proposed action.

As described more fully in Chapter I, the three principal reasons for the proposed action are: a) to provide the amount of timber that this area can supply for area lumber mills; b) to reduce the risk of insect and disease mortality and provide for long-term increased sustained yield of wood products of desired species and size; and c) to improve big game winter range habitat within the area. It does not seem reasonable to consider alternatives unrelated to the purpose of the proposed action.

TABLE 2-2
SUMMARY OF PROPOSED MANAGEMENT ACTIVITIES BY ALTERNATIVES

RESOURCE MGMT FEATURES (Shown as ACRES except where noted)	<- ALTERNATIVES ->										
TIMBER MANAGEMENT ACTIVITIES:	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Total Proposed Timber Harvest	0	2,290	1,945	990	2,669	1,695	1,105	1,547	1,767	2973	3098
Total Timber Volume Offered (MMBF)	0	21.1	7.9	5.8	15.7	11.8	7.2	11.2	12.9	19.3	15.9
Number of Timber Harvest Units	0	62	29	19	51	45	40	44	52	66	63
EVEN-AGED TIMBER MANAGEMENT											
Clear Cut Harvest - Subtotal	0	640	0	0	0	125	85	0	75	75	0
as percent of total harvest	0	28	0	0	0	7	8	0	4	3	0
Seed Tree Harvest - Subtotal	0	530	0	105	160	325	280	300	325	325	140
as percent of total harvest	0	23	0	11	6	19	25	19	18	11	5
Shelterwood Harvest - Subtotal	0	0	105	60	333	133	0	160	200	270	273
as percent of total harvest	0	0	5	6	12	8	0	10	11	9	9
Overstory Removal Harvest - Subtotal	0	135	0	0	149	72	0	90	115	164	49
as percent of total harvest	0	6	0	0	6	4	0	6	7	6	2
Total Proposed Even-Age Harvest	**0**	**1,305**	**105**	**165**	**642**	**655**	**365**	**550**	**715**	**834**	**462**
as percent of total harvest	0	57	5	17	24	39	33	36	40	28	15
UNEVEN-AGED TIMBER MANAGEMENT											
Individual Tree/Group Selection Harvest	0	0	270	80	80	140	135	40	40	40	817
as percent of total harvest	0	0	14	8	3	8	12	3	2	1	26
INTERMEDIATE TIMBER MANAGEMENT	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Basal Area Thin Harvest - Subtotal	0	275	520	275	497	275	210	567	597	719	717
as percent of total harvest	0	12	27	28	19	16	19	37	34	24	23
Commercial Thin Harvest - Subtotal	0	290	195	110	278	185	125	125	125	293	491
as percent of total harvest	0	13	10	11	11	11	11	8	7	10	16
Salvage Harvest - Subtotal	0	420	855	360	1172	440	270	265	290	1087	611
as percent of total harvest	0	18	44	36	44	26	24	17	16	37	20
Total Proposed Intermediate Harvest	**0**	**985**	**1,570**	**745**	**1947**	**900**	**605**	**957**	**1,012**	**2099**	**1819**
as percent of total harvest	0	43	81	75	74	53	55	62	57	71	59
SILVICULTURAL TREATMENT											
Grapple Piling and Burning	0	405	65	125	245	413	210	258	338	338	344
Broadcast Burning	0	395	0	0	0	45	85	0	45	45	0
Underburning	0	200	40	40	40	125	70	202	217	217	0
Artificial Regeneration (plus spot planting)	0	1,090	0	65	85	262	220	107	197	197	106
Natural Regeneration	0	175	105	100	428	353	145	363	423	493	358
Yard Tops, Pile and Burn Landing	0	1,290	1,840	825	995	1112	740	1,087	1,167	1167	1679
Precommercial Thin	0	40	40	40	0	40	40	80	0	80	27
ROAD MANAGEMENT ACTIVITIES (Miles)											
New Construction	0	20.5	7.7	0	0	12.1	7.6	7.2	9.7	9.7	8.7
Reconstruction	0	12.6	7.2	7.2	8.5	8.5	7.2	8.5	8.5	8.5	8.4

COMPARISON OF THE ALTERNATIVES CONSIDERED IN DETAIL

This section presents a comparison of alternatives by issue. Resource outputs and environmental effects are presented in a comparative format with explanation of the important differences between alternatives. Table 2-9, page 2-62, provides a numerical comparison of the ways each alternative responds to the issues, as measured by the indicators. Environmental effects of the alternatives are more fully displayed and interpreted in Chapter 4.

For comparative purposes, Alternative H was identified as the initial proposed action. This alternative was developed early in the planning process to feature Forest Plan projected timber harvest acreage outputs.

ISSUE 1: ROADLESS CHARACTER

Summary of Effects on Roadless Character

Primitive Recreation and Solitude - Alternatives B2, EH, H, I, J1, J2, J2H, and K would all significantly and adversely affect the potential for primitive recreation. There would be major disruption to the trail system, visual appearance, and solitude (noises from logging/road traffic).

In contrast, Alternatives A, E, and, to a slightly smaller degree, Alternative D retain much of the existing primitive recreation/solitude conditions. The opportunity to designate this area as wilderness is also preserved in all of these alternatives.

Apparent Naturalness, Natural Integrity - Alternatives B2, EH, H, I, J1, J2, J2H, and K would all significantly and adversely affect the natural values found in this area. Man's influence would tend to dominate natural forces. Subsurface water flow would be intercepted by roads. Erosion from roads would cause increased sedimentation (but staying within State Water Quality Standards). Wildlife habitat values, including security, would decline.

Alternatives A, E, and, to a slightly smaller degree, Alternative D would retain the dominance of natural values. Pristine water quality, undisturbed views, and undisturbed soils are major values which remain unaltered by man's influence. The roadless area would remain an area dominated by the natural forces of wind, fire, insect and disease, and climate.

ALTERNATIVES A and E

These two alternatives would preserve the roadless area in its entirety. The positive effects of not developing this area are:

1) The views of the roadless area from the Moyie River, the Moyie River road, trails within the area, and residences which look upon the area would remain undisturbed and natural. Road construction and harvesting would not lower the visual quality. On-site views of harvesting are distasteful to many people: stumps, bulldozed earth, slash, and roads are not a pretty sight, no matter how well done.

2) Pristine water quality would be preserved in Bussard and Rutledge Creeks, which flow into the Moyie River (once studied for Scenic River designation). Fisheries in the river would be supported at the current level.

3) Leaving the area undeveloped retains part of the wild character associated with this part of northern Idaho. This is an important value to local residents.

4) The Beeline Water Association water supply system would remain at its current high quality level. Past harvest activity has caused sedimentation at the intake; however, the level of sediment is still within State of Idaho proposed standards for a public water supply system.

5) Wildlife habitat would remain undisturbed; it would be controlled by natural forces. Habitat for most management indicator species would remain at low/moderate quality levels (see Chapter 4 pages 4-104 thru 4-137). Species for which security is the most critical factor would be favorably affected by not developing the area. These species are wolverine, lynx, boreal owl, and most management indicator species, including elk, pine martin, northern goshawk, and white-tailed deer.

6) It would remain a place dominated by natural forces--fire, wind, insects and disease, weather,

and climate. Development would not interfere with these forces.

7) The potential for primitive recreation from 26 miles of existing trails would remain. This area, because of the lack of threatened and endangered species habitat, has the potential for some further recreational trail development. Mountain bike trails have been proposed for this area. This potential would have high quality if the area were left undeveloped.

Existing recreation use includes one outfitter and guide based out of Snyder Guard Station, hunters, horseback riding, and ORV use. Hiking would continue in a undisturbed environment. This is an important value to these users. Development would cause much of the use to be foregone.

8) The option for Congress to designate the area as wilderness would be preserved.

Leaving the area natural would not have any negative effects on the roadless area values.

ALTERNATIVES B2 and H

These alternatives are similar in their effects on roadless value. There would be no positive effects on roadless area values due to development. The negative effects include:

1) All of the positive values preserved under the No Action Alternative would be adversely affected. The significant adverse effects would be on the visual, natural, wildlife, recreational, and wild character values.

Water quality would be adversely affected but not judged to be significant. State water quality standards would be met, best management practices would be applied, Forest Plan standards for protecting fisheries quality would be met, and monitoring would insure adverse impacts are minimized.

2) The option for Congress to designate this area as wilderness would be foregone. Only a small portion of the area remains roadless. (See maps in Chapter 4)

ALTERNATIVES EH, I, J1, J2, J2H, and K

All of these alternatives would develop more than half of the roadless area; leaving less than the 5,000 acre minimum roadless intact. The opportunity for Congress to designate the area as wilderness would be foregone. Since no roads would be constructed into the roadless area with alternative EH, the option for Congress to designate the area as wilderness could be maintained. However, it would take several decades of inactivity in the roadless area for the vegetation to recover to the point that the disturbance caused by this alternative would no longer detract from the roadless values. The chances of this occuring are remote at best. There would be no positive effects on the roadless value due to these alternatives. The negative effects are:

1) Visual quality declines. While the effects vary to some degree among these six alternatives, the overall common impact would be to disturb the natural landscape with roads and harvest units. The effects are mitigated in Alternatives EH, I, J1, J2, J2H, and K by achieving a visual quality standard of slightly noticeable (USDA, Forest Service 1974). This would lower the quality of views for local residents. Alternatives EH, J2H, and K would selectively harvest some units higher on the slope. The effect of this would be slightly noticeable.

2) Wildlife security habitat would be adversely impacted. This would be mitigated to some extent by road closures.

3) Habitat for most managment indicator species would decline somewhat.

4) Solitude would be significantly lowered in the area developed and in the area remaining roadless. The core of the area is less than one mile from some development, which would leave little buffer, especially from the sounds and sights of logging.

5) For these same reasons, primitive recreation opportunities would also be significantly impacted.

6) Water quality would be impacted to a minor degree.

7) Natural integrity would tend to be overridden by man's activities. Man's actions would tend to dominate, rather than the natural forces of wind, fire, climate, and insects/disease.

ALTERNATIVE D

This alternative would preserve 5,600 acres of roadless area, which is above the Congressional minimum for wilderness designation. The relative positive effects of this alternative on the roadless values are:

1) 5,600 acres of roadless area would remain undeveloped, including the important scenic values surrounding Queen Mountain and Queen Lake. The trail to Queen Mountain/Queen Lake is not disturbed.

2) There would be no additional effect on the Beeline Water Association water system.

3) Some of the wild character of this area would remain; however, the narrow configuration of this area tends to dilute these values. The higher elevations tend to be the area left; this is also the area most visible from the Moyie River, so important visual values would be retained.

4) Wildlife security habitat would be retained. While not as large as in Alternatives A or E; 5,600 acres of roadless is judged to have significant value.

The negative values of Alternative D on roadless values are:

1) The Rutledge trail system would be disrupted at the lower elevations; this keeps the tendency to "chop" the system into shorter, undeveloped sections.

2) Some road construction and timber harvesting may be visible from the Moyie River Valley. However, these effects are mitigated by the emphasis on partial cutting harvest units. Many of the units are lower on the slope where vegetative screening would also reduce visual impacts.

3) Bussard Creek would be crossed twice with new road construction, which would lower water quality slightly. Little effect should be evident in Rutledge Creek as no roads cross this channel. A no-cut zone in excess of 100 feet wide would be left between the stream and the only unit within this watershed.

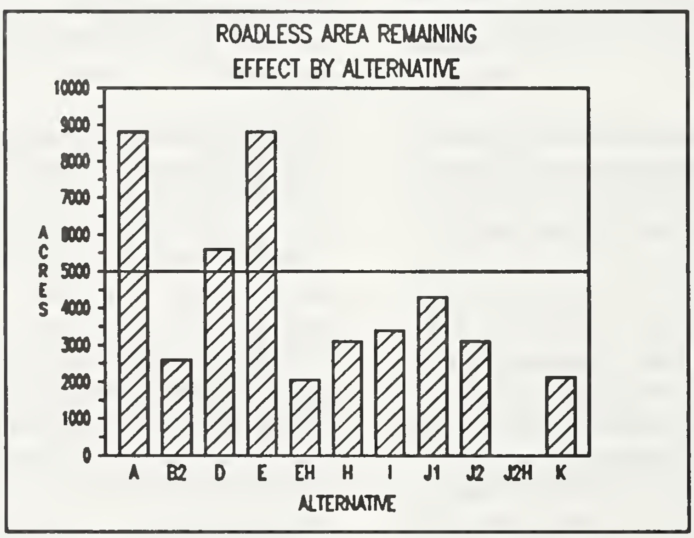


FIGURE 2-11 shows the acres remaining undisturbed under each alternative

ISSUE 2: WATER QUALITY/FISHERIES

Summary of Effects on Water Quality and Fisheries

Watersheds exhibit great natural variability in flow, and can accomodate some increase in peak flows without damage to the resource. However, when the dominant discharge exceeds the geomorphic channel stability threshold, the watershed equilibrium will shift in response. Channel scouring will occur in headwater reaches and sediment deposition will increase in lower reaches. This increased bedload movement will reduce pool size and quality, and reduce the quality and quantity of fish habitat.

The percent of peak flow increase that a watershed can safely accept is dependent upon the stability of its channels. All channels within the Decision Area, except Hellroaring Creek, have good to fair stability, and can sustain increases in peak flow between 15 and 20 percent (USDA Forest Service, 1978b). Timber harvest activities that result in increased peak flows significantly less than these thresholds will not cause damage to watersheds or stream channels. Also, changes to beneficial downstream uses would not be noticeable. The channel condition for Hellroaring Creek is currently poor, the water yield increase should remain below eight percent to prevent declines in the channel condition.

Upper Meadow Creek supplies water to the public Beeline Water Association. The State of Idaho Water Quality Bureau has agreed that an increase in sediment production of 25 percent would meet the proposed state public water supply standards for this drainage. This conclusion was supported by comparing the Beeline Water Association's maintenance records and turbidity monitoring to the R1R4 model predictions of what has occurred in Upper Meadow Creek in the past. The projected effect on the water system of this increase in sediment production was based on the actual effect of past sediment yield increases (see Appendix C for documentation). All alternatives would meet this established threshold for Upper Meadow Creek.

Reflecting past and present managment, the current water quality and stream channel conditions of the Moyie River are good, see Chapter 3 description of the physical characteristics of the river. If future activities within the Moyie River drainage continue at approximately the same intensity, the current condition should not deteriorate and could actually improve over the existing conditions.

Increases in peak flows in Hellroaring Creek, as a result of the activities that would be implemented with Alternative B2, could result in increased bedload movement and stream channel degradation. Increased bedload deposits in the aluvial fan reach of this stream could occur with this alternative. This would in turn likely cause the stream to more frequently change channel locations. There would likely be a loss in pool habitat for fish within this portion of Hellroaring Creek. Highway 95 serves as a detention basin for aluvial deposits and as sediment trap for Hellroaring Creek prior to its confluence with Round Prairie Creek. Because Round Prairie Creek is a slow moving meandering stream course for most of the distance it runs across the northern end of the Decision Area, and highway 95 acts as a sediment trap, Alternative B2 would unlikely result in increased sediment delivery or bedload movement in the Moyie River.

The effects of Alternative B2 on the remainder of the drainages within the Decision Area would be minimal. The increases in water yield, especially peak flow, would be so minimal that there would be little risk of increasing bedload movement. There would also be little risk in degrading stream channel stability in the remaining drainages. There would be no quantitative changes in fish habitat conditions, see Appendix C.

The effects of the remaining alternatives on the drainages within the Decision Area would be minimal. The increases in water yield, especially peak flow, would be so minimal that there would be little risk of increasing bedload movement. There would also be little risk in degrading stream channel stability in any of the drainages. There would be no quantitative changes in fish habitat conditions resulting from these alternatives, see Appendix C.

TABLE 2-3

SEDIMENT YIELD PERCENT INCREASE OVER BASE RATES

DRAINAGE / PEAK YEAR	BASE **	ALT A	ALT B2	ALT D	ALT E	ALT EH	ALT H	ALT I	ALT J1	ALT J2	ALT J2H	ALT K
Hellroaring Ridge 1994	12	16	33	16	16	16	33	16	25	25	25	25
Hellroaring Creek 1995	12	13	83	16	16	16	25	25	33	33	33	33
Little Hellr Cr 1995	14	14	35	28	35	35	35	21	35	35	35	35
Bussard Lake 1995	18	0	155	83	5	20	127	50	50	50	50	55
Bussard Creek 1995	17	0	35	5	0	0	5	5	5	5	5	5
Snyder 1995	27	0	40	40	0	14	25	3	48	51	51	55
Upper Meadow Cr 1996	12	8	25	8	8	8	25	16	8	16	16	25
Rutledge Creek 1995	20	0	5	0	0	5	5	0	5	5	10	10
Rutledge Cr Trail 1995	28	0	128	89	0	25	107	117	107	107	107	114
McDougal Creek 1996	25	20	40	24	28	24	24	20	36	36	44	40
Wall Creek 1995	13	7	100	53	7	7	61	7	7	38	38	46
Meadow Cr Tributaries 1996	23	4	134	4	4	4	4	4	69	69	69	73
Meadow Creek 1996	11	9	118	9	9	9	9	9	9	9	9	14

** BASE IS SHOWN AS TONS PER SQUARE MILE PER YEAR

TABLE 2-4

PEAK WATER FLOWS PERCENTAGE OVER BASE

DRAINAGE/(PEAK YEAR)	BASE **	ALT A	ALT B2	ALT D	ALT E	ALT EH	ALT H	ALT I	ALT J1	ALT J2	ALT J2H	ALT K
HELLROARING RIDGE (1994)	20.0	5	5	5	5	5	5	5	5	5	5	5
HELLROARING CREEK (1995)	37.5	5	8	5	6	6	6	6	6	6	6	6
LITTLE HELLROARING CR (1995)	10.5	6	7	6	7	7	7	7	8	8	8	7
BUSSARD LAKE (1995)	30.1	2	6	3	2	4	3	3	3	3	4	4
BUSSARD CREEK/(1995)	14.5	0	2	0	0	1	0	0	1	1	1	1
SNYDER (1995)	10.6	0	4	1	0	5	2	1	1	2	5	3
UPPER MEADOW CREEK (1996)	46.2	1	2	1	1	1	2	2	1	2	2	2
RUTLEDGE CREEK (1995)	6.9	3	4	3	3	4	3	3	3	4	4	4
RUTLEDGE CREEK TRAIL (1995)	10.8	0	4	1	0	5	3	2	2	2	6	6
MCDOUGAL CREEK (1996)	9.1	3	4	3	4	4	4	4	5	5	5	4
WALL CREEK (1996)	16.9	5	5	5	5	5	5	5	5	5	5	5
MEADOW CR TRIBUTARIES (1996)	10.9	1	2	1	1	1	1	1	1	1	1	1
MEADOW CREEK (1996)	10.1	2	2	2	2	2	2	2	2	2	2	2

** BASE IS SHOWN AS CFS/MONTH

TABLE 2-5

ANNUAL WATER YIELD PERCENTAGE OVER BASE FOR ALL ALTERNATIVES

DRAINAGE PEAK YEAR	BASE ACRE FEET	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Hellroaring Ridge 1994	3,328	4	5	4	4	5	5	4	5	5	5	5
Hellroaring Creek 1995	6,244	5	7	5	5	5	6	5	6	6	6	5
Little Hellr'ing Cr 1995	1,747	6	7	6	7	7	7	6	7	7	7	7
Bussard Lake 1995	5,019	1	5	2	2	3	3	3	3	3	4	4
Bussard Creek 1995	2,420	0	2	0	0	1	0	0	0	0	1	0
Snyder 1995	1,758	0	4	1	0	4	2	1	1	2	4	3
Upper Meadow Creek 1996	7,698	1	2	1	1	1	2	2	1	2	2	2
Rutledge Creek 1995	1,149	3	3	3	3	4	3	3	3	3	4	4
Rutledge Creek Trail 1995	1,798	0	3	1	0	5	2	2	2	2	5	5
McDougal Creek 1996	1,516	3	4	3	4	4	4	4	4	4	4	4
Wall Creek 1996	2,821	4	5	4	4	4	5	4	4	5	5	4
Meadow Cr Tribs. 1996	1,815	1	2	1	1	1	1	1	1	1	1	1
Meadow Creek 1996	1,677	1	2	1	2	2	2	1	2	2	2	1

ISSUE 3: VISUAL QUALITY

As presented later in this section, Alternative E, which would not enter the roadless area, would result in little change in the visual character of the Decision Area. Comparing the effects of Alternative E to the effects of the other action alternatives provides the approximate degree of change in the visual condition that is due to entry into the roadless area. All alternatives enter the roadless area with conventional harvesting techniques, except Alternatives D and E, and would result in a significant change in the visual condition of the area. This change in visual condition is due primarily to roadless area entry. Alternative D enters the roadless area, but uses less noticeable harvesting techniques, therefore it would result in less change in visual condition of the area.

Summary of Effects on Visual Quality

ALTERNATIVE B2 would significantly and adversely affect the visual quality of the Decision Area. Harvesting activities would dominate most views from the viewpoints in the Moyie River Valley and Round Prairie Creek. This alternative would not be consistent with Forest Plan visual quality objectives for the area.

ALTERNATIVES EH, H, I, J1, J2, J2H, and K would significantly affect the visual quality of the Decision Area. Harvesting activities would be noticeable, but would not dominate the landscape as viewed from the viewpoints identified in Chapter 3. These alternatives would meet Forest Plan visual quality objectives.

ALTERNATIVE E would cause little change in the appearance of the Decision Area. The undisturbed appearance of the roadless area would be retained. Harvesting activities around the perimeter of the roadless area would be noticeable, but would not dominate the landscape. This alternative would meet Forest Plan visual quality objectives.

ALTERNATIVE D would retain undisturbed views for most of the Decision Area. Harvesting activities under this alternative are predominately the less noticeable partial cutting.

ALTERNATIVE A would not result in a change in the appearance of the Decision Area. Only natural forces would continue to change the appearance of the area. These alternatives would meet Forest Plan visual quality objectives.

Several comments on the DEIS stated concerns over the visual impact of clearcutting, others also stated concerns over sparse seed-tree cutting. The following graph summarizes the amount of clearcutting and seed-tree cutting as compared to other harvest methods that would occur with each alternative.

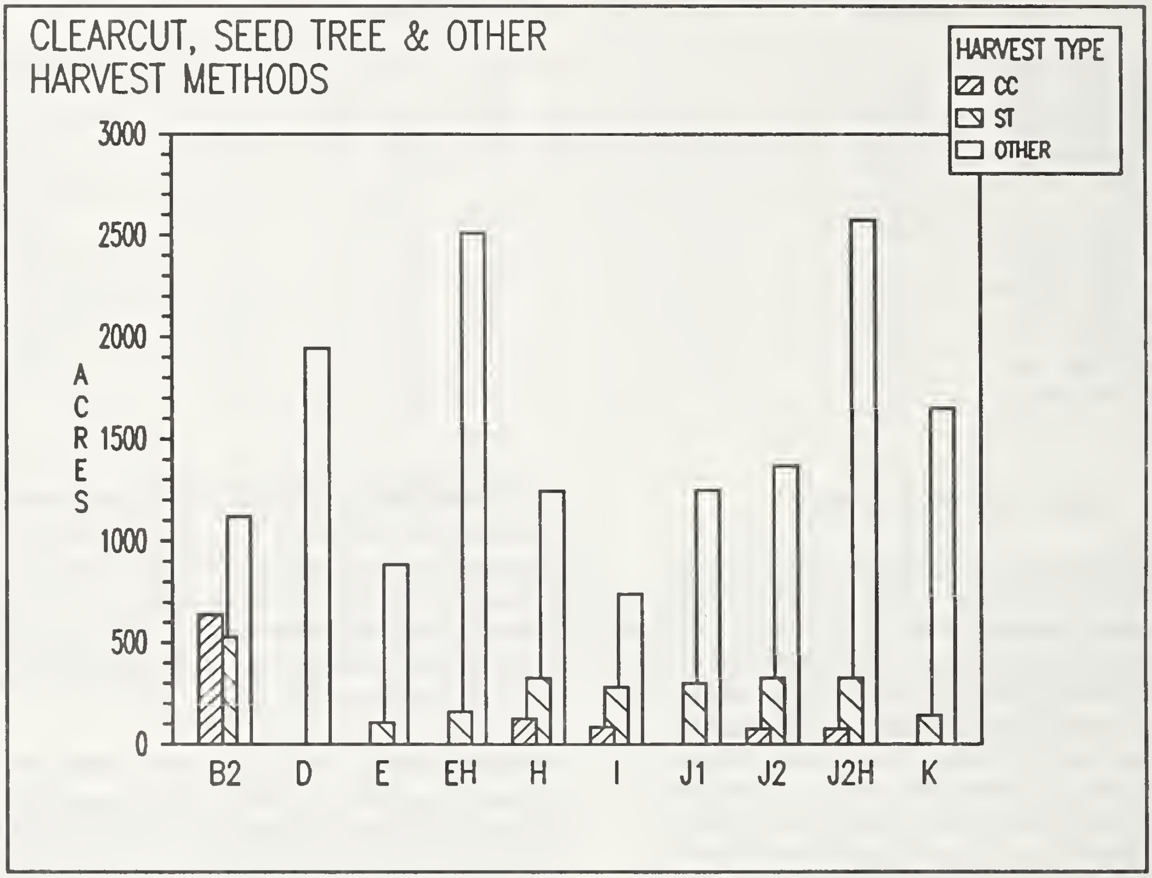


Figure 2-12

ALTERNATIVE A

Under the No Action Alternative, the general appearance of the Decision Area would remain the same. The untouched appearing condition of the slopes above the Moyie River would be retained. However, there may be a change in appearance as the lodgepole pine and white pine component deteriorates. This change may be either gradual or dramatic, depending on mortality rates of the pine.

No steps would be taken to soften the appearance of the midslope geometrically shaped units in Hellroaring Creek that are visible from Highway 95.

ALTERNATIVE B2

Alternative B2 would change the visual character of the Decision Area. This is measured by change in Visual Condition Class (VCC). It would result in the elimination of the Untouched VCC. The VCC of Major Disturbance would increase from 6,175 acres to 13,320 acres. This action would not be consistent with Forest Plan Visual Quality Objectives when observed from the viewpoints identified in Chapter 3.

Clearcut and seedtree harvesting units would be obvious to anyone traveling through the Moyie River Valley. The size, shape, and location of the units would dominate the landscape along the river. The natural untouched appearance of this area would be foregone.

No steps would be taken to soften the appearance of the midslope geometrically shaped units in Hellroaring Creek that are visible from Highway 95.

ALTERNATIVE D

Alternative D was designed to provide greater emphasis on visual quality by eliminating clearcut and seed-tree harvesting units. It provides a higher degree of visual quality protection as compared to the visual quality impacts of the initial proposed action.

There would be a reduction in the Untouched VCC from 8,571 acres to 5,015 acres, with a corresponding increase in the Unnoticed and Minor Disturbance VCC. Harvest units and roads along the Moyie River would not be noticeable to travelers passing through the area. There would be no clearcut or seedtree harvest units to dominate the view. Most visitors would not notice a change from the natural untouched appearance of the area. Local residents would still notice that some activities have taken place, but the appearance would not be unpleasant to most.

No steps would be taken to soften the appearance of the midslope geometrically shaped units in Hellroaring Creek that are visible from Highway 95.

ALTERNATIVE E

Alternative E demonstrates the result of implementing timber harvesting from existing roads and outside the roadless area. There would be no clearcutting with this alternative; however, there would be 105 acres of seedtree harvesting. There would be a reduction in the Unnoticed VCC from 950 acres to 623 acres and a corresponding increase in the Disturbed VCC. This is a very minor change when compared with the existing conditions.

The general appearance of the Decision Area would remain unchanged. Travelers along the Moyie River and Highway 95, as well as most local residents would not notice a change in the landscape. The untouched appearing condition on the slopes above the river would be retained.

No steps would be taken to soften the appearance of the midslope geometrically shaped units in Hellroaring Creek that are visible from Highway 95.

ALTERNATIVE EH

Alternative EH would change the visual character of the Decision Area. It would result in the elimination of the Untouched VCC. Areas that could have been considered Untouched would be classed as Unnoticed VCC on 4,060 acres. The Disturbed VCC would increase from 1,665 acres to 6,363 acres.

As observed from the viewpoints identified in Chapter 3, this action would be consistent with Forest Plan Visual Quality Objectives. There would no clearcutting with this alternative. Shelterwood harvesting units along the Moyie River would be noticed by some visitors passing through the area and by most local residents.

While the natural undisturbed appearance of the area would be foregone, the harvest units would not dominate the landscape. They would be designed to blend with the natural appearance of the area. To soften the long term effect of this harvesting, seed-trees will be left on these units for approximately 60 years. This will help the harvesting look like a more natural appearing occurrence.

The midslope helicopter harvesting units along the Moyie River would generally go unnoticed to visitors to the Moyie River Valley and local residents. However, units 138, 139, and 140 would retain less than 30 percent canopy cover. These units would be obvious to local residents, who may find their appearance unpleasing.

Partial cutting around the geometrically shaped midslope units in Hellroaring Creek would soften the contrast between these units and the surrounding timber stands. The existing units would still not meet Forest Plan Visual Quality Objectives, but their appearance would recover to a more natural condition more quickly.

ALTERNATIVE H

Alternative H would change the visual character of the Decision Area. The VCC of Untouched would be eliminated. While there would still be approximately 4,400 acres that could be classed as Untouched, this is below the minimum size for this VCC. This area was therefore included in the VCC of Unnoticed which increased in area from 950 acres to 5,016 acres. The VCC of Disturbed increased in size from 1,665 acres to 6,120 acres. When observed from the viewpoints identified in Chapter 3, the proposed action would be consistent with Forest Plan Visual Quality Objectives.

Seedtree and shelterwood harvest units would be visable to most travelers passing through the area and to local residents. However, these units would not dominate the landscape and would blend in with the natural appearance of the area for most visitors. Local residents may find the view displeasing as compared to the current untouched appearance.

No steps would be taken to soften the appearance of the midslope geometrically shaped units in Hellroaring Creek that are visible from Highway 95.

ALTERNATIVE I

This alternative would result in the elimination of the Untouched VCC. Areas that could have been considered Untouched but were less than 5,000 acres would be classed as Unnoticed VCC on 6248 acres. The Minor Disturbance VCC would increase from 1,265 acres to 3,608 acres and the Disturbed VCC would increase from 1,665 acres to 2,545 acres.

As observed from the viewpoints identified in Chapter 3, this action would be consistent with Forest Plan visual quality objectives. Because most of the harvest units in visually sensitive areas would be small (five acres), they would not be obvious to most visitors traveling through the area or to most local residents. However, seed-tree units 38 and 39, just west of Sinclair Lake, would be larger than the rest of the units along the Moyie River and would be obvious to most forest visitors and local residents.

No steps would be taken to soften the appearance of the midslope geometrically shaped units in Hellroaring Creek that are visible from Highway 95.

ALTERNATIVE J1

Alternative J1 would result in a reduction in the Untouched VCC from 8,571 acres to 6,934 acres. There would be a corresponding increase in the Minor Disturbance and Disturbed VCCs. This action would be consistent with Forest Plan Visual Quality Objectives.

There would be no clearcutting with this alternative. However, seedtree and shelterwood harvesting units along the Moyie River would be noticed by most visitors passing through the area and by local residents. While the natural untouched appearance of the area would be foregone, the harvest units would not dominate the landscape. They would be designed to blend with the natural appearance of the area. To soften the long term effect, seed trees will be left on these units for approximately 60 years. This will help the harvesting look like a more natural appearing occurrence.

Partial cutting around the geometrically shaped midslope units in Hellroaring Creek would soften the contrast between these units and the surrounding timber stands. The existing units would still not meet Forest Plan Visual Quality Objectives, but their appearance would recover to a more natural condition more quickly.

ALTERNATIVE J2

Alternative J2 would result in a reduction of the Untouched VCC from 8,571 acres to 5,579 acres. The VCC of Minor Disturbance would increase

from 1,265 acres to 1,592 acres and the VCC of Disturbed would increase from 1,665 acres to 4,517 acres.

As observed from the viewpoints identified in Chapter 3, this action would be consistent with Forest Plan Visual Quality Objectives. There would be 75 acres of clearcutting with this alternative. These clearcuts would be located in the head end of East Fork Meadow Creek and Wall Creek where they would not be readily visable from the viewpoints identified in Chapter 3. Seedtree and shelterwood harvesting units along the Moyie River would be noticed by most visitors passing through the area and by local residents.

While the natural untouched appearance of the area would be foregone, the harvest units would not dominate the landscape. They would be designed to blend with the natural appearance of the area. To soften the long term effect of this harvesting, seed trees will be left on these units for approximately 60 years. This will help the harvesting look like a more natural appearing occurrence.

Partial cutting around the geometrically shaped midslope units in Hellroaring Creek would soften the contrast between these units and the surrounding timber stands. The existing units would still not meet Forest Plan Visual Quality Objectives, but their appearance would recover to a more natural condition more quickly.

ALTERNATIVE J2H

Alternative J2H would change the visual character of the Decision Area. It would result in the elimination of the Untouched VCC. Areas that could have been considered Untouched would be classed as Unnoticed VCC on 2,923 acres. The Disturbed VCC would increase from 1,665 acres to 7,500 acres.

As observed from the viewpoints identified in Chapter 3, this action would be consistent with Forest Plan Visual Quality Objectives. There would be 75 acres of clearcutting with this alternative. These clearcuts would be located in the head end of East Fork Meadow Creek and Wall Creek where they would not be readily visible from the viewpoints identified in Chapter 3. Seedtree and shelterwood harvesting units along the Moyie River would be noticed by most visitors passing through the area and by local residents.

While the natural undisturbed appearance of the area would be foregone, the harvest units would not dominate the landscape. They would be designed to blend with the natural appearance of the area. To soften the long term effect of this harvesting, seed trees will be left on these units for approximately 60 years. This will help the harvesting look like a more natural appearing occurrence.

The midslope helicopter harvesting units along the Moyie River would generally go unnoticed to visitors to the Moyie River Valley and local residents. However, units 138, 139, and 140 would retain less than 30 percent canopy cover. These units would be obvious to local residents, who may find their appearance unpleasing.

Partial cutting around the geometrically shaped midslope units in Hellroaring Creek would soften the contrast between these units and the surrounding timber stands. The existing units would still not meet Forest Plan Visual Quality Objectives, but their appearance would recover to a more natural condition more quickly.

ALTERNATIVE K

Alternative K would change the visual character of the Decision Area. It would result in the elimination of the Untouched VCC. Areas that could have been considered Untouched would be classed as Unnoticed VCC on 3,750 acres. The Disturbed VCC would increase from 1,665 acres to 5,523 acres.

As observed from the viewpoints identified in Chapter 3, this action would be consistent with Forest Plan Visual Quality Objectives. There would no clearcutting with this alternative. Shelterwood harvesting units along the Moyie River would be noticed by some visitors passing through the area and by most local residents.

While the natural undisturbed appearance of the area would be foregone, the harvest units would

not dominate the landscape. They would be designed to blend with the natural appearance of the area. To soften the long term effect of this harvesting, seed trees will be left on these units for approximately 60 years. This will help the harvesting look like a more natural appearing occurrence.

The midslope helicopter harvesting units along the Moyie River would generally go unnoticed to visitors to the Moyie River Valley and local residents. However, units 138, 139, and 140 would retain less than 30 percent canopy cover. These units would be obvious to local residents, who may find their appearance unpleasing.

Partial cutting around the geometrically shaped midslope units in Hellroaring Creek would soften the contrast between these units and the surrounding timber stands. The existing units would still not meet Forest Plan Visual Quality Objectives, but their appearance would recover to a more natural condition more quickly.

ISSUE 4: WILDLIFE

Most impacts to wildlife species discussed below are directly related to entry into the roadless area. This can be seen by comparing alternatives A (no action) and E (no roadless area entry) to other alternatives. Alternatives that essentially eliminate all roadless values result in impacts to wildlife species that are not within the forest plan guidelines nor the regional recommendations (alternatives EH and J2H).

Summary of Effects on Wildlife

ALTERNATIVES B2 and J2H would significantly affect most wildlife species. These alternatives would result in habitat conditions below recommended levels for elk, white-tailed deer winter range, goshawks, and boreal owls.

ALTERNATIVE EH would significantly affect most wildlife species. Elk habitat is reduced, white-tailed deer winter range is affected. However, the cover/opening ratio is maintained within the recommended range. This alternative would not provide suitable habitat to maintain nesting goshawks. There would be a minor reduction in boreal owl nesting habitat, increasing the chance of local loss of the local population.

ALTERNATIVES D, H, J1, J2, and K would significantly affect most wildlife species. Elk habitat is reduced. White-tailed deer winter range is affected. However, the cover/opening ratio is maintained within the recommended range. Alternative J2 would not provide suitable habitat to maintain nesting goshawks. Alternatives H and J2 would further reduce boreal owl habitat and increase the chance of loss of the local population from lack of sufficient habitat.

ALTERNATIVE E would increase the disturbance to most wildlife species. This disturbance would be shortlived and minor as no new roads would be constructed. Alternative E would further reduce boreal owl habitat and increase the chance of loss of the local population from lack of sufficient habitat.

ALTERNATIVE I would increase disturbance, but in the long term it would be an improvement for most big game species. Security would be increased by additional road closures. Winter range cover/opening ratio would be maintained within the recommended range for white-tailed deer. Pine martin and goshawk habitat necessary to support the local populations would be maintained.

Mature and Old-Growth Related Species

Boreal Owl

It is unlikely that the Decision Area contains sufficient acreage of suitable habitat types to maintain a self-sustaining population of owls. In addition, past wildfires and timber harvesting have reduced available nesting habitat below the recommended minimum threshold levels necessary to maintain a local population. Alternatives B2, H, I, J2, and J2H would harvest additional timber in spruce/fir habitat types and further reduce the nesting habitat. This would increase the potential for loss of the local population. Alternatives D, E, EH, and K would also harvest a small amount of timber in spruce/fir habitat types. Alternatives D and K would incorporate prescriptions that are

compatible with owl nesting requirements. Alternatives E and EH would result in a small amount of harvest from existing roads. These four alternatives would result in minimal impacts on boreal owl habitat and should not affect the population of owls in the Decision Area.

Goshawks

There are no Forest Plan guidelines for determining maintenance needs for a viable goshawk population. Regional management recommendations are to provide habitat for at least one nesting pair on each 10,000 acre management unit (USDA Forest Service, 1989c).

All alternatives would retain a sufficient number of suitable nesting stands to support one pair of breeding goshawks within each of the three goshawk analysis units. However, based on HSI model interpretation, only goshawk analysis unit 2 in compartment 730 contains sufficient feeding habitat to provide overall suitable habitat to support goshawks. This compartment currently is 80 percent roadless and contains good distribution of high value feeding and nesting stands needed to support one pair of nesting goshawks. Goshawk unit one, compartment 727, is less than 10 percent roadless, it does not contain the acreage and distribution of high value feeding stands necessary to provide suitable feeding habitat required to support nesting goshawks. Goshawk unit three, compartment 735, is currently 40 percent roadless. This compartment provides good distribution of habitat, but there are numerous stands that are of low value for goshawk feeding habitat.

Alternatives A, D, E, H, I, J1, and K would not reduce the ability of goshawk analysis unit two to support one nesting pair of Goshawks for the time being. While these alternatives would result in additional losses of feeding habitat, the Habitat Suitability Index (HSI) model indicated that the minimum requirement for feeding habitat would be maintained with these alternatives.

Based on the HSI model, there would be insufficient feeding habitat to support even one pair of nesting goshawks with Alternatives B2, EH, J2, and J2H.

Additional analysis between the DEIS and the Final EIS revealed that goshawk analysis unit two could be affected by a mountain pine beetle epidemic. Such an epidemic is predicted as highly probable within the next ten to 15 years in the Moyie River drainage (Gibson, 1990). In the event of the loss of the lodgepole pine stands, the HSI feeding value for goshawk unit two would be reduced from .53 to .48. This could make the unit unsuitable for goshawk. As goshawk unit one and three have proportionately the same amount of high risk lodgepole pine stands as unit two, similar affects could be expected in these units. An epidemic in the Moyie River drainage would further reduce the HSI feeding value below the suggested threshold of .50 in goshawk unit one and three.

HSI values near the threshold level of 0.50 must be interpreted with caution. The inherent variability of the data is reflected to some degree in the resulting HSI values. This places more emphasis on professional judgement for values near the threshold level. The HSI model by itself can not definitely calculate that such units with a value near 0.50, do or do not contain the habitat necessary for a pair of nesting goshawks. HSI's are best used to determine the relative value of analysis units and alternatives.

Alternatives EH, J2H, and K treat sufficient high risk acreage to have potential to reduce the risk of a mountain pine beetle epidemic. They would provide higher feeding values over time than if an epidemic occurs.

Pine Marten

There are no specific Forest Plan standards or objectives that deal with maintaining a pine marten population. The Decision Area was divided into eight marten habitat analysis units, each considered to be the typical home range of one male and two female martens.

Based on its size, the Decision Area is incapable of supporting a fully self-sustaining pine marten population. However, the area is capable of supporting a local population. It does contain the travel corridors necessary to provide for dispersal of pine marten from and into the Decision Area, thus increasing the genetic diversity of the local

population (see biological corridor analysis pages 3-54 and 4-147).

Alternatives A, E, EH, I, J1, J2, J2H, and K would result in no change in the number of pine marten analysis units that are capable of supporting martens. Six of the eight units in the Decision Area would have suitable habitat. The two analysis units that do not provide suitable habitat are in the Hellroaring Creek area. Due to past roading and to a lesser degree timber harvesting, these units may also serve as a barrier to interchange between the local population and marten populations north of Round Prairie Creek. These alternatives would maintain existing travel corridors for dispersal.

Alternative B2 would reduce from six to four, the number of analysis units that contain suitable habitat. It would also maintain existing travel corridors for pine marten dispersal.

Alternatives H and D would both reduce from six to five, the number of analysis units that contain suitable habitat. These alternatives would maintain existing travel corridors for pine marten dispersal.

BIG GAME

Big game management indicator species include elk, moose, and white-tailed deer. There are no Forest Plan elk habitat targets for the West Moyie Decision Area as well as the remainder of Boundary County. Elk habitat effectiveness serves as the indicator for all big game summer range conditions, it was selected because of the public interest expressed for elk habitat. In addition, the effectiveness of the North Idaho Elk Habitat Guidelines in measuring habitat effectiveness is a good indicator for all big game species present in the Decision Area as well as species susceptible to trapping (i.e. pine martin, lynx, and wolverine). Idaho Fish and Game generally recognizes elk habitat at 50 percent of potential as the minimum level acceptable to maintain Fish and Game objectives.

White-tailed deer winter range condition serves as the indicator for all big game winter range. The criteria for measuring winter range conditions are cover/opening ratio and average opening size. The recommended cover/opening ratio for habitat types found within the Decision area is from 60/40 to 80/20. The recommended regeneration unit size is 10 acres (Jageman, 1984).

Alternative A The current elk habitat effectiveness is 56 percent of potential. The existing cover/opening ratio within the suitable winter range portion of the Decision Area is 79/21.

Alternative B2 would reduce the elk habitat effectiveness by 7 percent to 49 percent of potential for the ten year period following the start of timber sale activity within the Decision Area. This is below the level desired by the Idaho Fish and Game, but does not violate any Forest Plan standards.

Alternative B2 would result in a reduction in cover/opening ratio from 79/21 to 55/45. This is below the level recommended for cover in white-tailed deer winter range. The average opening size for harvest units in suitable winter range is 28 acres. This is larger than recommended opening sizes.

Alternative EH would reduce the elk habitat effectiveness for the ten year period to 48 percent of potential. This low habitat effectiveness is due to the degree of disturbance associated with the helicopter logging activity. The helicopter use would impact large areas, leaving little security habitat. Following sale activities, the elk habitat effectiveness would be 51 percent of potential. Helicopter yarding would eliminate the need for roaded access. In the long term, greater than ten years, this action would result in less impact to elk and other animals which need security habitat than alternatives that would result in road construction.

Alternative EH would reduce the cover/opening ratio to 60/40. This is at the lower end of the recommended range for white-tailed deer winter range. Average opening size for harvest units would be 21 acres, which is larger than recommended opening sizes.

Alternatives D, E, H, J1 and J2 would reduce the elk habitat effectiveness within the Decision

Area for the ten-year period to 50 to 52 percent of potential.

The cover/opening ratio for alternatives D, E, H, J1 and J2 would be from 62/38 to 65/35, and are therefore within the recommended range. The average harvest unit size within the suitable winter range varies from 19 acres with Alternative J1 to 21 acres with Alternative D. These are larger than the recommended range for opening size in winter range areas. Alternative J1 does, however, set in motion a harvest pattern that will enable a 80/20 cover/opening ratio over a rotation.

Alternative I would increase the elk habitat to 59 percent of potential for the ten year period, with a long range goal to reach 70 percent of potential during periods of inactivity. This increase in elk habitat effectiveness is accomplished by closing all newly constructed roads and all existing roads except for the major access roads to Queen Mountain and the Hellroaring Creek-Bussard Mountain-Meadow Creek connection road.

Alternative I would result in a cover/opening ratio of 69/31 and an average harvest unit of five acres in size within suitable white-tailed deer winter range areas. The long term goal of this alternative would be to develop a cover/opening ratio of 80/20 over the period of a rotation. Both cover/opening ratio and unit size are within the recommendations for winter range management.

Alternative J2H would reduce the elk habitat effectiveness for the ten year period to 46 percent of potential. This low habitat effectiveness is due to the degree of disturbance associated with the helicopter logging activity. The helicopter use would impact large areas and occur at a time when cultural treatments would be ongoing on other sales in the area, leaving little security habitat. Following sale activities, the elk habitat effectiveness would be 51 percent if additional helicopter logging was not planned.

Alternative J2H would reduce the cover/opening ratio to 56/44. This is below the recommended range for white-tailed deer winter range. Average opening size for harvest units would be 23.4 acres, which is larger than recommended opening sizes.

Alternative K would reduce the elk habitat effectiveness for the ten year period to 47 percent of potential. This low habitat effectiveness is due to the degree of disturbance associated with the helicopter logging activity. The helicopter use would impact large areas and occur at a time when cultural treatments would be ongoing on other sales in the area, leaving little security habitat. Following sale activities, the elk habitat effectiveness would be 51 percent if additional helicopter logging was not planned.

Alternative K would reduce the cover/opening ratio to 65/35. This is within the recommended range for white-tailed deer winter range. Average opening size for harvest units would be 17 acres, which is larger than recommended opening sizes.

TABLE 2-6

Average Winter Range Cutting Unit Size (Acres)

Alternative	B2	D	E	EH	H	I	J1	J2	J2H	K
Average Unit Size	28	21	20	21	21	5	19	21	23	17

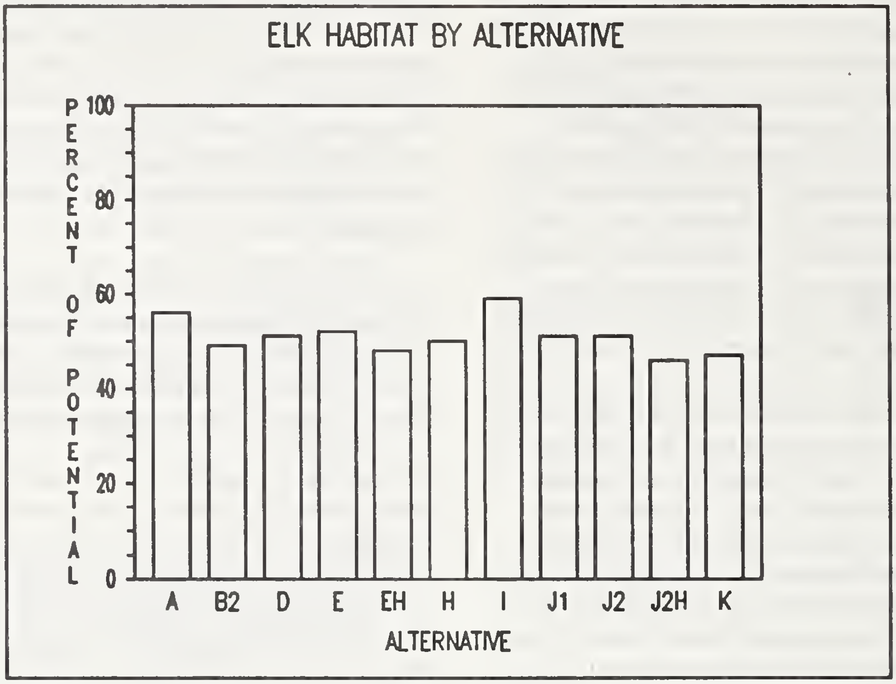


FIGURE 2-13 SHOWS THE PERCENTAGE OF THE POTENTIAL ELK HABITAT EFFECTIVENESS FOR THE TEN YEAR PERIOD. IDAHO FISH & GAME RECOGNIZES THE MININUM ACCEPTABLE LEVEL AS 50 PERCENT.

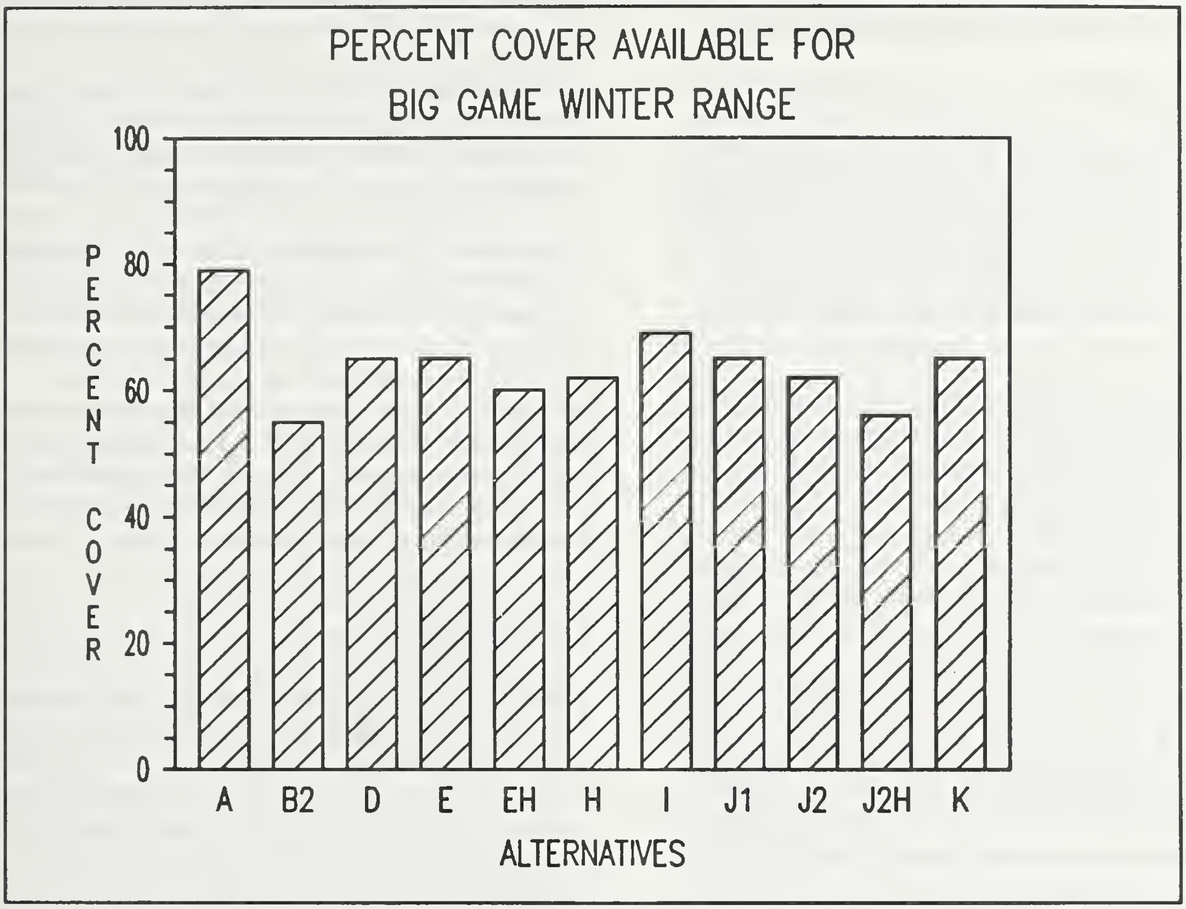


FIGURE 2-14 SHOWS THE PERCENT OF COVER AVAILABLE FOR BIG GAME WINTER RANGE UNDER EACH ALTERNATIVE. THE IPNF FOREST PLAN RECOMMENDS A RANGE BETWEEN 60 AND 80 PERCENT.

ISSUE 5: VEGETATION

Summary of Effects on Biodiversity

Fragmentation

The existing situation is portrayed by Alternative A, in which there are seven blocks of land exceeding 80 acres which currently exist as suitable habitat for interior forest habitat species. (Chapter 3, Figure 3-14 on page 3-56 shows the existing forested environment and additional information can be read in Chapter 3 pages 3-34 and Chapter 4 pages 4-143 thru 4-145). An 80-acre stand size is considered as approximately the minimum size for an effective interior forest habitat area (Doyle, 1990). Increases in the number of blocks of interior forested habitat result from one interior block being fragmented by such management activities as road construction or timber harvest. Maps of each alternative depicting the changes in interior forest habitat are located in the planning records.

For all action alternatives, the acreage of interior forest habitat would be reduced from the existing situation. Alternative E would have the lowest reduction, 900 acres, because this alternative would include no new road construction. The greatest reduction would occur in Alternatives J2H and K because of the their higher acreage of intermediate treatments.

Intermediate treatments (basal area and commercial thinnings and sanitation-salvages as well as uneven-aged timber harvests) however, would not have the same effects to interior forest species as even-aged regeneration harvests (clearcut, seed tree, and shelterwood). Intermediate and uneven-aged treatments would result in a temporary reduction in the effectiveness of these areas as habitat for interior forest species. Less vegetative disturbance in these treatments, however, would allow their faster recovery to an existing condition as the canopy of trees and the understory vegetation grow and skidtrails re-vegetate.

The least effect would occur in those units which would be helicopter-logged as no roads or skidtrails would be constructed. Moreover, these areas would still provide a set of habitat conditions which would allow most interior forest habitat species to use these areas as travel or migration corridors or feeding areas. For instance, pine marten would still travel through these areas in the winter because the existing snow-intercepting capabilities of the tree canopy would remain. On the other hand, marten would generally avoid clearcuts because of the deeper ground snow levels. The acreage of intermediate harvest and uneven-aged management are displayed for each alternative.

There would be no increase in number of blocks of interior forest in Alternative E, and the largest increase would be created in Alternatives EH, J2H, and K. Several of the fragments created in the latter three alternatives would result from salvage harvests. As discussed above, these areas would cause a temporary reduction in effectiveness for interior forest habitat species, but would not have the same degree of effect as even-aged harvest treatments.

Biological Corridors

Linkages to forested areas outside the Decision Area are discussed in detail in Chapter 3, page 3-54. These linkages provide biological corridors for movement of interior plants and animals. The various combinations of harvest units and road locations would modify the existing forested corridors as described in detail in Chapter 4, page 4-147.

Comparison of Alternatives
Effects on Biodiversity Elements of Old-Growth Forest and Fragmentation

Alternative A, the no action alternative, would not harvest any old-growth. Old-growth would be maintained at current levels.

The Decision Area currently contains 13,162 acres of interior forested habitat located in seven blocks Six major biological corridors have been identified (see map of existing interior forested habitat and cooridors, Chapter 3, page 3-56).

Alternative B2 would have the greatest impact on old-growth. Alternative B2 would propose 14 acres of harvest in the existing old-growth stand in Section 33 of the East Fork of Meadow Creek. Additionally,

Alternative B2 would fragment 25 acres of recruitment old-growth by a road accessing Units 2 and 4.

Alternative B2 would reduce the effective interior forested habitat to 9,834 acres. The number of blocks of interior forested habitat would be increased from seven to 11, due to fragmentation from timber harvesting and road construction. One of the biological corridors would be substantially modified and three would be moderately modified. Two of the corridors would remain essentially unchanged.

Alternative D - fourteen acres of existing old-growth would be entered by this alternative in the East Fork of Meadow Creek, reducing the percentage of old-growth in OGMU 30 to 6.2 percent. Two areas of recruitment old-growth totalling 42 acres, located in McDougal and the East Fork of Meadow Creek, also would be entered. With these entries, the future option for these stands to become old-growth would be removed. After Alternative B2, Alternative D would have the second greatest effect on the old-growth resource.

Alternative D would reduce the effective interior forested habitat to 11,224 acres. The number of blocks of interior forested habitat would be increased from seven to eight. Two of the biological corridors would be moderately modified. The remaining four corridors would remain essentially unchanged.

Alternative E would harvest no acres of existing old-growth, but would salvage harvest 21 acres of recruitment old-growth located in Section 33 of McDougal Creek. The option for this area to become an old-growth area in the future would be removed.

Alternative E would reduce the effective interior forested habitat to 12,236 acres, the number of blocks of interior forested habitat would remain the same as there would be no new road construction with this alternative. One of the biological corridors would be moderately modified, the remaining corridors would remain essentially unchanged.

Alternative EH would be identical to Alternative E in effects to old-growth. Eighteen acres of recruitment old-growth would be harvested in Unit 106.

Alternative EH would reduce the effective interior forested habitat to 10,246 acres. The number of blocks of interior forested habitat would be increased from seven to 12, due to fragmentation from timber harvesting, much of which is sanitation salvage harvesting. One of the biological corridors would be substantially modified. The remaining corridors would remain essentially unchanged.

Alternative H - an estimated fourteen acres of existing old-growth in the East Fork of Meadow Creek in Section 33 would be harvested, causing a reduction in acreage to 6.2 percent in Old Growth Management Unit 30. The adjacent stand of recruitment old-growth also would be entered with 16 acres being harvested in Unit 54.

Alternative H would reduce the effective interior forested habitat to 10,838 acres. The number of blocks of interior forested habitat would be increased from seven to eight. Three of the biological corridors would be moderately modified, the remaining corridors would remain essentially unchanged.

Alternative I - no existing or recruitment old growth would be harvested in Alternative I. However, the road accessing Units 55, 56, and 56A would cause nine acres of existing old-growth to be fragmented from the remainder of the stand.

Alternative I would reduce the effective interior forested habitat to 11,636 acres. The number of blocks of interior forested habitat would be increased from seven to eight. One of the biological corridors would be substantially modified and one would be moderately modified. The remaining corridors would remain esentially unchanged.

Alternative J1 - As with the other J Alternatives and Alternative B2, 18 acres of recruitment old-growth would be harvested in Unit 3. No existing old-growth would be harvested in this alternative.

Alternative J1 would reduce the effective interior forested habitat to 11,711 acres. The number of blocks of interior forested habitat would be increased from seven to nine. Two of the biological corridors would be moderately modified. The remaining corridors would remain esentially unchanged.

Alternative J2 - No acres of existing old-growth would be harvested, but the road accessing Units 55, 56, and 56A would fragment 9 acres of existing old-growth in Section 33 of the East Fork of Meadow Creek. Eighteen acres of recruitment old-growth would be harvested in Unit 3 of this alternative.

Alternative J2 would reduce the effective interior forested habitat to 10,499 acres. The number of blocks of interior forested habitat would be increased from seven to 11, due to fragmentation from timber harvesting and road construction. One of the biological corridors would be substantially modified and two would be moderately modified. The remianing corridors would remain esentially unchanged.

Alternative J2H would have the same effects on old-growth as Alternative J2. No acres of existing old-growth would be harvested in Alternative J2H, but a road accessing Units 55, 56, and 56A would fragment 9 acres of existing old-growth in Section 33 of the East Fork of Meadow Creek. Eighteen acres of recruitment old-growth would be harvested in Unit 3 of this alternative.

Alternative J2H would reduce the effective interior forested habitat to 9,245 acres. The number of blocks of interior forested habitat would be increased from seven to 13, due to fragmentation from timber harvesting and road construction. One of the biological corridors would be substantially modified and two would be moderately modified. The remaining corridors would remain esentially unchanged.

Alternative K - no acres of existing old-growth would be harvested. However, the road accessing Unit 56 would isolate nine acres of existing old-growth in Section 33; this fragmentation would also occur in Alternatives I, J2, and J2H. Two acres of recruitment old-growth would be harvested in Unit 56.

Alternative K would reduce the effective interior forested habitat to 9,477 acres. The number of blocks of interior forested habitat would be increased from seven to 14, due to fragmentation from timber harvesting and road construction. One of the biological corridors would be substantially modified and two would be moderately modified. The remaining corridors would remain esentially unchanged.

Summary of Effects on Trees

The potential for major losses in growth and yield due to increased mortality from mountain pine beetle infestations is high with all alternatives except EH, J2H, and K. Losses of the growth and volume of the pine from an epidemic would counter-balance much of the growth potential of stands that would be put under intensive management with these alternatives. The amount of high risk stands treated with these alternatives varies from 0 percent with alternative A to 23 percent with alternative J2. Alternative J2H would treat approximately 58 percent of the high risk stands; alternative EH would treat approximately 53 percent of the high risk stands; and alternative K would treat approximately 43 percent of the high risk stands. The potential for a mountain pine beetle epidemic would be lowered with these alternative.

Alternatives B2, J2H, K, and EH would provide a significant amount of timber for local industry at 21.1 MMBF, 19.3 MMBF, 15.9, and 15.7MMBF respectively. Alternatives J2, H, and J1 would provide 12.9 MMBF, 11.8 MMBF, and 11.2 MMBF respectively; H and J2 harvest an acreage near the ground truth predictions of the Forest Plan. The remaining alternatives (D, E, and I) would all provide less than 7.9 MMBF of timber to local industry.

TABLE 2-7

REDUCTION OF INSECT AND DISEASE RISK

Alternative	B2	D	E	EH	H	I	J1	J2	J2H	K
Acres Treated	681	675	413	1816	635	471	741	790	1996	1476
Percent of Risk Treated	20%	20%	12%	53%	18%	14%	21%	23%	58%	43%

TABLE 2-8

TIMBER SUPPLY

Alternative	B2	D	E	EH	H	I	J1	J2	J2H	K
Volume Provided MMBF	21.1	7.9	5.8	15.7	11.8	7.1	11.2	12.9	19.3	15.9

Alternative A If the No Action Alternative were implemented, the condition of the timber would continue in its present course. The risk of future insect and disease infestations would remain high in the identified high risk stands. No timber volume from the Decision Area would be made available to the local timber industry at this time.

Alternative B2 would have a high potential for major losses in growth and yield, as it fails to treat 80 percent of the high risk pine stands. The potential for a major mountain pine beetle outbreak would remain high. Losses of the growth and volume of the pine from an epidemic would counter-balance much of the growth potential of the stands being put under intensive management. It would treat 681 acres (20 percent) of the high risk timber stands. 21.1 Million Board Feet (MMBF) of timber would be made available to the local timber industry.

Alternatives D, E, and I provide high scenic, roadless, and wildlife values. The trade-offs to achieve these values are reductions in the volume of timber offered to local industry and the amount of high risk timber treated.

These alternatives would have high potentials for major losses in growth and yield, as they would not treat up to 85 percent of the high risk pine stands. The potential for a major mountain pine beetle outbreak would remain high. Six to eight million board feet of timber would be made available to the local timber industry under these alternatives.

Alternative EH would have a low potential for major losses in growth and yield, as it would treat 53 percent of the high risk pine stands. The potential for a major mountain pine beetle outbreak would be low. It would treat 1816 acres of the high risk timber stands. 15.7 MMBF of timber would be made available to the local timber industry.

Alternatives H, J1 and J2 would have a high potential for major losses in growth and yield, as they would fail to treat about 80 percent of the high risk pine stands. The potential for a major mountain pine beetle outbreak would remain high. Losses of the growth and volume of the pine from an epidemic would counter-balance much of the growth potential of the stands being put under intensive management. Elleven to thirteen million board feet of timber would be made available to the local timber industry under these alternatives.

Alternative J2H would have the lowest potential for major losses in growth and yield, as it would treat 58 percent of the high risk pine stands. The potential

for a major mountain pine beetle outbreak would be low. It would treat 1996 acres of the high risk timber stands. 19.3 MMBF of timber would be made available to the local timber industry.

This alternative provides a means to maintain growth within the Decision Area and avoid potential catastrophic losses due to insect and disease. This alternative is essentially the same as Alternative J2, with 1206 acres of helicopter logging added in the inaccessible pine stands. This helicopter option was added to Alternative J2 to demonstrate the cumulative effects of the helicopter harvesting option when added to another alternative. The difference in effects between Alternative J2 and J2H are due entirely to the helicopter option. The helicopter option could be added to any of the action alternatives considered, and would have nearly the same effect on vegetation as it does on Alternative J2H.

Alternative K would have a low potential for major losses in growth and yield, as it would treat 43 percent of the high risk pine stands. The potential for a major mountain pine beetle outbreak would be low. It would treat 1476 acres of the high risk timber stands. 15.9 MMBF of timber would be made available to the local timber industry.

Summary of Effects of Implementation
Table 2-9

ALTERNATIVES

* ALTERNATIVE A IS THE PRESENT CONDITION

		A *	B2	D	E	EH	H	I	J1	J2	J2H	K
ROADLESS												
Acres Remaining		8800	2600	5600	8800	2050	3100	3400	4300	3100	0	2130
Wilderness Option Retained		Yes	No	Yes	Yes	No	No	No	No	No	No	No
WATER QUALITY												
Peak Water Yield Increase % Over Base												
Hellroaring Ridge	- Peak 1994	5	5	5	5	5	5	5	5	5	5	5
Hellroaring Creek	- Peak 1995	5	8	5	6	6	6	6	6	6	6	6
Little Hellroaring Cr	- Peak 1995	6	7	6	7	7	7	7	8	8	8	7
Bussard Lake	- Peak 1995	2	6	3	2	4	3	3	3	3	4	4
Bussard Creek	- Peak 1995	0	2	0	0	1	0	0	1	1	1	1
Snyder	- Peak 1995	0	4	1	0	5	2	1	1	2	5	3
Upper Meadow Cr	- Peak 1996	1	2	1	1	1	2	2	1	2	2	2
Rutledge Creek	- Peak 1995	3	4	3	3	4	3	3	3	4	4	4
Rutledge Cr Trail	- Peak 1995	0	4	1	0	5	3	2	2	2	6	6
McDougal Creek	- Peak 1996	3	4	3	4	4	4	4	5	5	5	4
Wall Creek	- Peak 1996	5	5	5	5	5	5	5	5	5	5	5
Meadow Cr Tributaries	- Peak 1996	1	2	1	1	1	1	1	1	1	1	1
Meadow Creek	- Peak 1996	2	2	2	2	2	2	2	2	2	2	2
Peak Sediment Yield Increase % Over Base												
Upper Meadow Cr	- Peak 1996	8	25	8	8	8	25	16	8	16	16	25

Summary of Effects of Implementation Continued

*** ALTERNATIVE A IS THE PRESENT CONDITION**

	ALTERNATIVES									
	A *	B2	D	E	EH	H	I	J1	J2	J2H	K
VISUAL QUALITY											
Visual Condition Class Acres											
Untouched *2	8571	0	5015	8571	0	0	0	6934	5579	0	0
Unnoticed	950	1496	1919	623	4683	5016	6248	623	623	3546	4373
Minor Disturbance	1265	1265	3852	1265	1265	1265	3608	2867	1592	1265	2415
Disturbed	1665	2545	1665	1992	6363	6120	2545	1887	4517	7500	5523
Major Disturbance	6175	13320	6175	6175	6315	6225	6225	6315	6315	6315	6315
Drastic Disturbance	0	0	0	0	0	0	0	0	0	0	0

*2 Untouched areas less than 5000 acres in size are reported as Unnoticed areas.

	A *	B2	D	E	EH	H	I	J1	J2	J2H	K
HARVEST METHOD											
Clearcut Acres	0	640	0	0	0	125	85	0	75	75	0
Seed-Tree Acres	0	530	0	105	160	325	280	300	325	325	140
Impact Area Not Meeting Adopted Visual Quality Objectives											
Acres	1810	8613	1810	1810	1810	1810	1810	1810	1810	1810	1810
WILDLIFE											
Elk Habitat % of Potential	56	49	51	52	48	50	59	51	51	46	47
White-tailed Deer											
Cover/Opening Ratio	71/29	55/45	65/35	65/35	60/40	62/38	69/31	65/35	62/38	56/44	65/35
Average Unit Size Acres	N/A	28	21	20	21	21	5	19	21	23	17
VEGETATION											
Total Harvest (MMBF)	0	21.1	7.9	5.8	15.7	11.8	7.2	11.2	12.9	19.3	15.9
Old Growth Harvest Acres	0	16	14	0	0	14	0	0	0	0	0
Potential Old Growth Recruitment Harvest Acres	0	40	42	21	21	16	0	18	18	18	2
High Risk Harvest Acres	0	681	675	413	1816	635	471	741	790	1996	1476
High Risk Harvest MMBF	0	8.3	6.3	4.0	12.1	6.5	4.4	6.8	7.5	13.8	12.3
High Risk Stands Treated (% Total)	0	20	20	12	53	18	14	21	23	58	43
Mountain Pine Beetle Potential for Epidemic	High	High	High	High	Low	High	High	High	High	Low	Low

CHAPTER 3 AFFECTED ENVIRONMENT

Acknowledgement

The artwork throughout this document was drawn by Maridel J. Merritt, ID Team Member.

Changes Between the Draft and Final EIS

For further clarification of the existing environment and to aid in understanding of the potential effects the alternatives would have on the natural resources, we have added some discussion to the sections on roadless areas, water quality, wildlife, vegetation, and cultural resources.

In response to a request received during public comments on the Draft EIS, a summary of the Forest-wide roadless areas is now included. Also, the activities which have occurred on the Bonners Ferry Ranger District as a result of implementation of the Forest Plan up to this time are shown.

Additions have been made concerning the Moyie River and Hellroaring Creek drainage. The current condition of the Moyie River and Hellroaring Creek drainage have been further reviewed by the Regional and Forest hydrologists and the Forest fisheries biologist and their findings are included. Prior to and during analysis for the Draft, the Three Mile and Moyie Springs public water systems drew their water directly from the Moyie River. They have subsequently drilled surface water wells adjacent to the river. This has relieved them of the turbidity problems associated with seasonal fluctuations in water flows in the river.

A map of goshawk nesting habitat and old-growth forest has been added as well as further discussion of the value of existing nesting habitat.

The Vegetation section now includes a discussion on biodiversity which identifies specific aspects of biological diversity which will be addressed in the Chapter 4 analysis of the area. Descriptions of special or unique environments, riparian areas, and forest fragmentation have been added.

Since release of the Draft EIS, the district archeologist has also developed a model to help him predict the probable occurance of prehistoric sites in a given area.

INTRODUCTION

This chapter describes the portions of the physical and biological conditions that may be affected by implementation of any of the alternatives. The description focuses on resource conditions in the area potentially affected by the alternatives. Some resource conditions such as water quality and certain wildlife species consider a larger area if potential effects extend beyond the Decision Area. This description of current conditions provides the basis for assessing the environmental effects of alternatives discussed in Chapter Four (Environmental Consequences). It also provides the context for assessing how the alternatives respond to the Issues identified in Chapter Two.

FOREST PLAN MANAGEMENT DIRECTION

Development of this Environmental Impact Statement follows implementing regulations of the National Forest Management Act of 1976 (NFMA), Title 36; Code of Federal Regulations, Part 219 (36 CFR 219); National Environmantal Policy Act of 1969 (NEPA), Title 40; Code of Federal Regulations, Parts 1500-1508 (40 CFR 1500-1508); and is tiered to the Forest Plan Environmental Impact Statement (1987).

This analysis incorporates direction provided in the Forest Plan (1987). The Forest Plan, based on the various considerations addressed in the Final Environmental Impact Statement (FEIS), guides all natural resource management activities and establishes standards and goals for management of the Idaho Panhandle National Forests.

FOREST-WIDE STANDARDS AND GOALS

Visual Quality

The Forest Plan establishes a forest-wide goal to manage the visual resource by maintaining adopted Visual Quality Objectives (Forest Plan, pg. II-1). The objective of landscape management will be to manage the Forest lands to attain high visual quality commensurate with other resources. This is implied in all management goals (Forest Plan, pg. II-4 and II-25, 26).

Water Quality

The Forest Plan establishes the Forest-wide goal of maintaining high quality water to protect fisheries habitat, water-based recreation, and public water supplies, and to be within State water quality standards (Forest Plan, pg. II-2). Additional water quality standards are described on pages II-9 and II-33 of the Forest Plan.

Wildlife

Forest-wide goals for wildlife resources include:

- provide for a diversity of plant and animal communities
- manage vertebrate wildlife habitat to maintain viable populations of all species
- manage big game habitat toward achieving the goals of the Idaho Department of Fish and Game
- manage habitat of animal and plant species listed under the Endangered Species Act to provide for recovery as outlined in the species recovery or management plans
- manage habitat to maintain populations of identified sensitive species of animals and plants (Forest Plan, pg. II-1). Discussions on pages II-5, II-6, and II-27 to II-29 of the Forest Plan provide more detailed standards for achieving these wildlife goals.

Timber Yield

The Forest Plan establishes a Forest-wide goal to provide a sustained timber yield that is responsive to local industry and national needs and strive to maintain current harvest levels. To provide more desirable age class distribution, begin harvest in stands created by the 1910 fire (Forest Plan, pg. II-2). The Plan also establishes the objective to minimize the hazard of insects and diseases through timber management. These and other Forest-wide timber standards and goals are further detailed on pages II-8 and II-31 and 32 of the Forest Plan.

Transportation Facilities

The Forest Plan establishes a Forest-wide goal to develop and manage the road system to the minimum standards and miles necessary to meet the objectives of the management areas (Forest Plan, page II-2 and II-10). The standards to accomplish this goal are listed in detail in the Forest Plan (pages II-35 and II-36).

MANAGEMENT AREA STANDARDS AND GOALS

The Forest Plan includes standards and goals for 19 Management Areas (MA's), which are geographic subunits of the Forest with different management emphases. The combination of these Management Area emphases are intended to achieve the Forest-wide goals and objectives. The West Moyie Decision Area includes four different Management Areas. The following chart shows the acreage included in each Management Area as a percentage of the total Decision Area acreage. The map on the facing page shows the locations of these Management Areas.

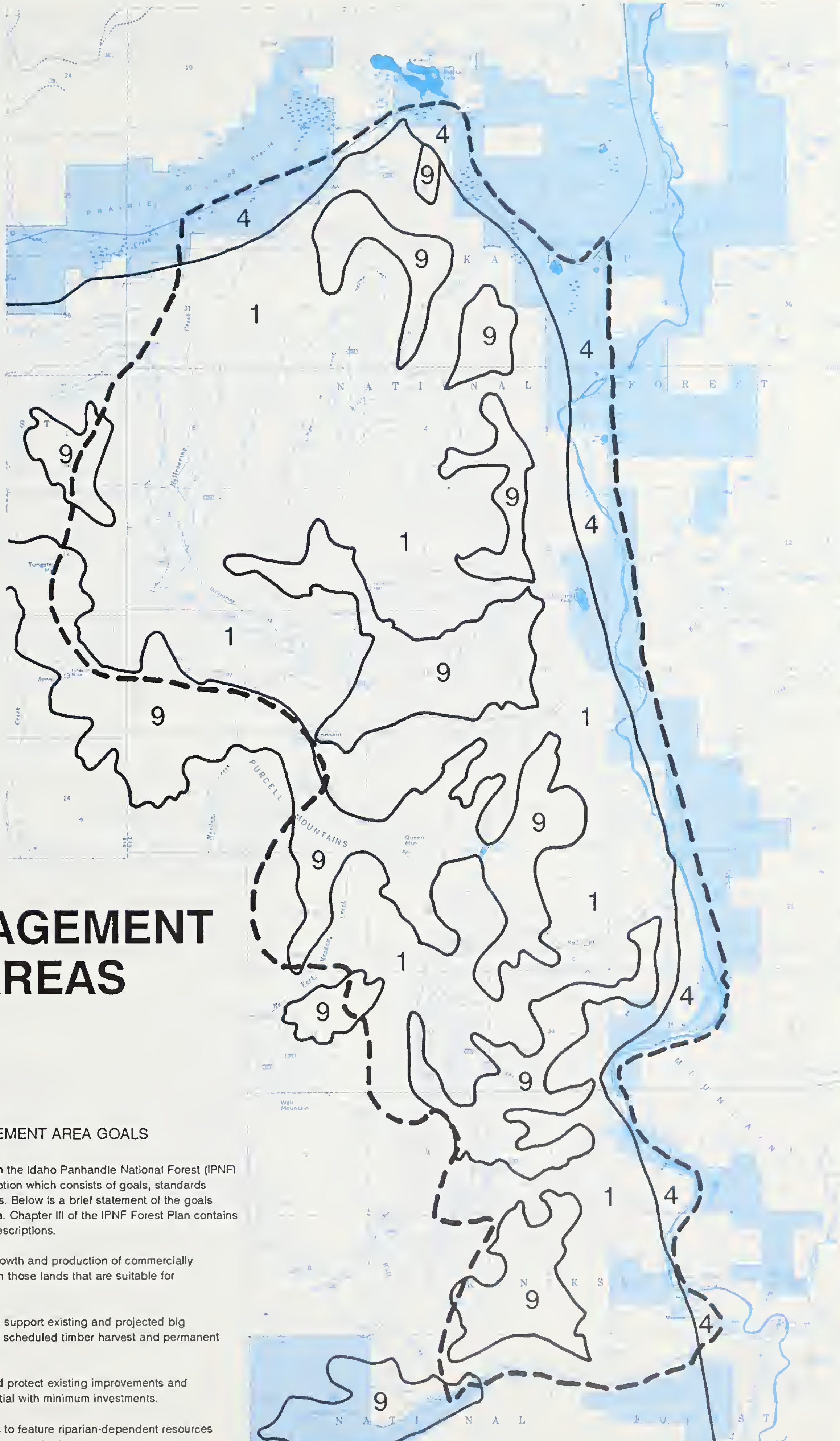


Figure 3-1

MANAGEMENT AREAS

MANAGEMENT AREA GOALS

Each management area on the Idaho Panhandle National Forest (IPNF) has a multiple use prescription which consists of goals, standards and management practices. Below is a brief statement of the goals for each management area. Chapter III of the IPNF Forest Plan contains a full description of the prescriptions.

1. Provide for long-term growth and production of commercially valuable wood products on those lands that are suitable for timber production.

4. Provide winter forage to support existing and projected big game populations through scheduled timber harvest and permanent forage areas.

9. Manage to maintain and protect existing improvements and resource productive potential with minimum investments.

16. Manage riparian areas to feature riparian-dependent resources while producing other resource outputs.

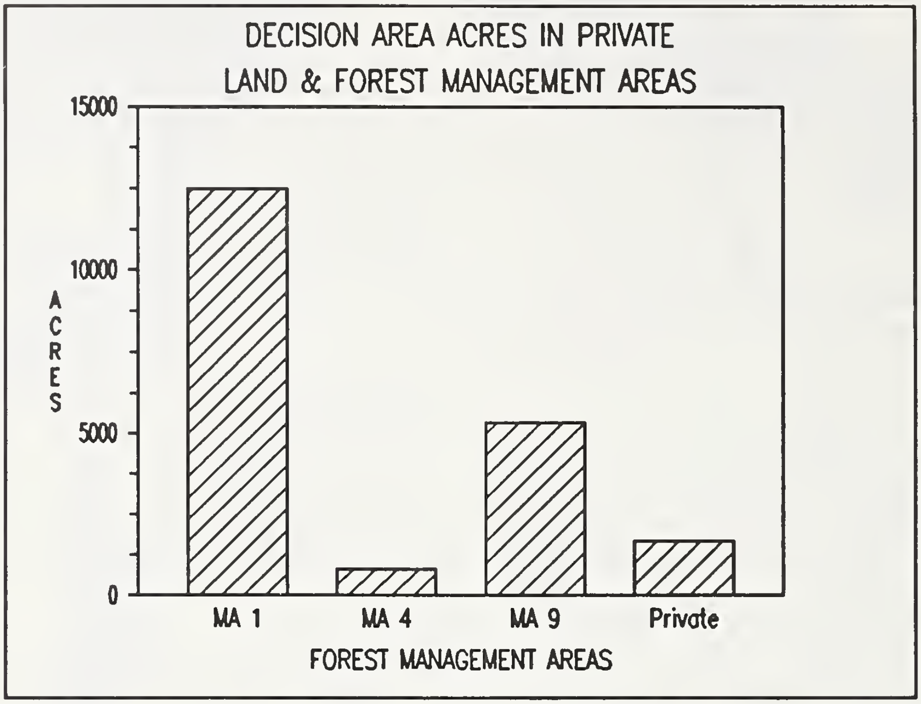


FIGURE 3-2

The Management Areas and the primary goals of each are described as follows:

MA 1 (Timber)

The Forest Plan goal for this MA is to emphasize timber production, using various silvicultural practices while providing for other resource values such as soil, water quality, wildlife, dispersed recreation, and visual quality. Timber management prescriptions will generally utilize even-aged regeneration harvest systems, with uneven-aged systems applied in special cases, such as visually sensitive areas (Forest Plan, pgs.III-2 to III-6).

Reforestation by either natural or artificial means, depending on site-specific silvicultural prescriptions, and precommercial thinning will ensure optimal stocking and volume growth. Wildlife habitat effectiveness will be maintained through the use of road closures, except as needed for timber management activities.

Other goals include (Forest Plan, pgs.III-2 to III-6):

- Manage those lands suitable for timber production for the long-term growth and production of commercially valuable wood products.
- Provide cost effective timber production.
- Protect soil productivity.
- Meet or exceed State of Idaho water quality standards.
- Provide wildlife habitat.
- Provide opportunities for dispersed recreation.
- Meet visual quality objectives.

MA 4 (Big Game Winter Range/Timber)

The Forest Plan goal for this MA is to manage big game winter range to provide sufficient forage to support projected big game habitat needs through scheduled timber harvest and permanent forage areas (Forest Plan, page III-17).

Timber management regimes will be based on analysis of site-specific objectives consistent with big game winter range needs. Even-aged regeneration systems will generally be used to stimulate forage production. Uneven-aged systems will be applied in special cases, such as visually sensitive areas or those areas where cover within forage areas is important (Forest Plan, page III-19).

Additional goals in this MA include (Forest Plan, pgs.III-17 to III-22):

- Provide long-term growth and production of commercially valuable wood products.
- Provide cost effective timber production.
- Protect soil productivity.
- Meet or exceed State of Idaho water quality standards.
- Provide for opportunities for dispersed recreation consistent with wildlife habitat needs.
- Meet visual quality objectives.

MA 9 (Maintenance)

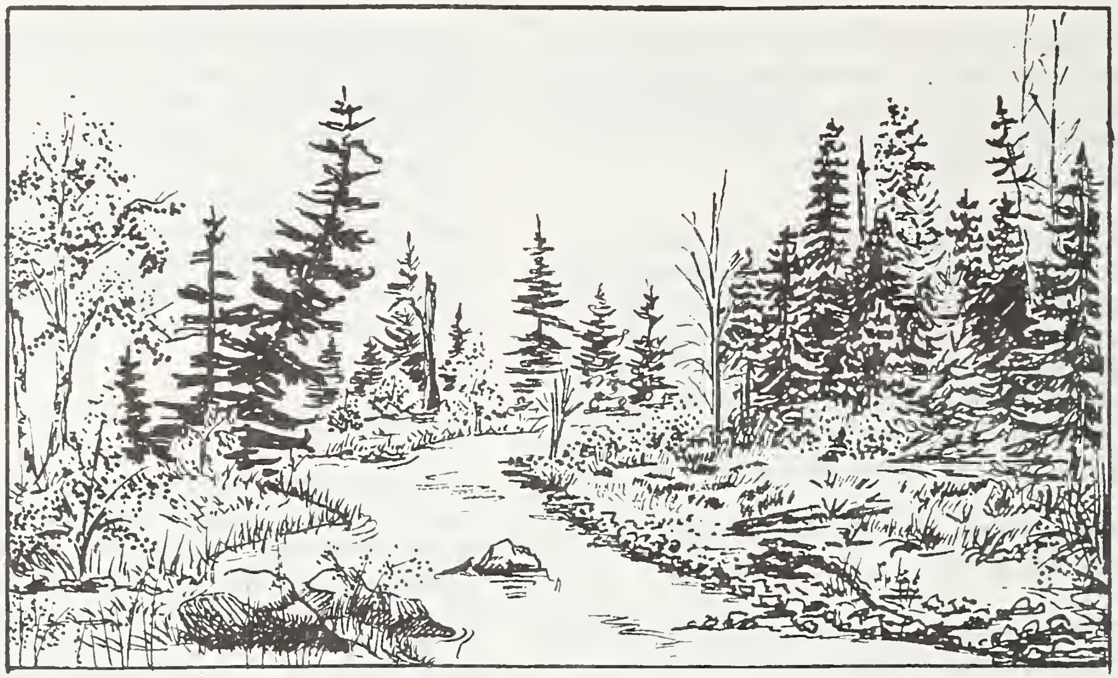
This MA consists of areas of non-forest lands, lands not capable of producing industrial products, lands physically unsuited for timber production, and lands capable of timber production but isolated by the above type lands or nonpublic ownership. Forest Plan objectives within this MA are management to maintain and protect existing improvements and resource productive potential with minimum investments and to meet visual quality objectives. (Forest Plan, pgs. III-39 to III-41)

MA 16 (Riparian Areas)

Forest Plan goals are to manage riparian areas to feature riparian-dependent resources (fish, water quality, maintenance of natural channels, certain vegetation and wildlife communities) while producing other resource outputs (Forest Plan, page III-68). Both even-aged and uneven-aged regeneration systems will be used to protect and maintain riparian resource values. Even-aged management will generally open no more than 600 feet along a stream or lake and no more than five to six percent of a stream in one decade, except as needed for riparian-dependent resources (Forest Plan, page III-70).

Other MA goals include Forest Plan, pgs.III-68 to III-73):

- Meet or exceed State water quality objectives.
- Protect soil productivity.
- Provide cost effective timber production.
- Provide for big game and non-game wildlife habitat.
- Provide opportunities for dispersed recreation consistent with riparian protection requirements.
- Meet visual quality objectives.



In riparian areas such as the one illustrated by this sketch, the vegetation and micro-climate are influenced by perennial and/or intermittent water.

This section starts with a discussion of the Forest and District-wide roadless area resource. It contains maps of the district roadless areas and the Hellroaring Roadless Area which is in the West Moyie Decision Area. The current condition of this area is described in the last part of this section.

One respondent to the Draft EIS asked that roadless areas be discussed on the Forest-wide and District-wide levels. The following tables summarize those roadless area allocations made in the Forest Plan. The data in these tables was taken from the appropriate roadless area descriptions in Appendix C of the Forest Plan Draft EIS. The beginning page numbers for each narrative are C-36, C-60, C-69, C-332, C-343, C-366, C-399, C-457, and C-484.

Acres of roadless lands at the time of the 1987 Roadless Area Inventory serve as the existing condition except as noted in the Selkirk and Hellroaring areas.

A map of the existing Roadless Areas on the Bonners Ferry Ranger District is displayed on the next page and a map of the existing condition of the Hellroaring Roadless Area is shown on page 3-11. Appendix C of the Forest Plan DEIS contains maps for each Roadless Area on the Forest (refer to those page numbers indicated above).

TABLE 3-1

FOREST-WIDE

ROADLESS AREA ALLOCATIONS

Management Action (MA)	Acres (1000's)	Percent Roadless Inventory
1987 Roadless Area Inventory	858.3	-
MA's Allow Future Roading	583.6	68
Remain Roadless	137.0	16
MA's Not Necessitating Road Construction	60.0	07
First Decade Implementation:		
Roaded Activity	190.0	22
Undeveloped	600.0	70

Data in this table is calculated from information on pages 20 and 21 of the Forest Plan Record of Decision.

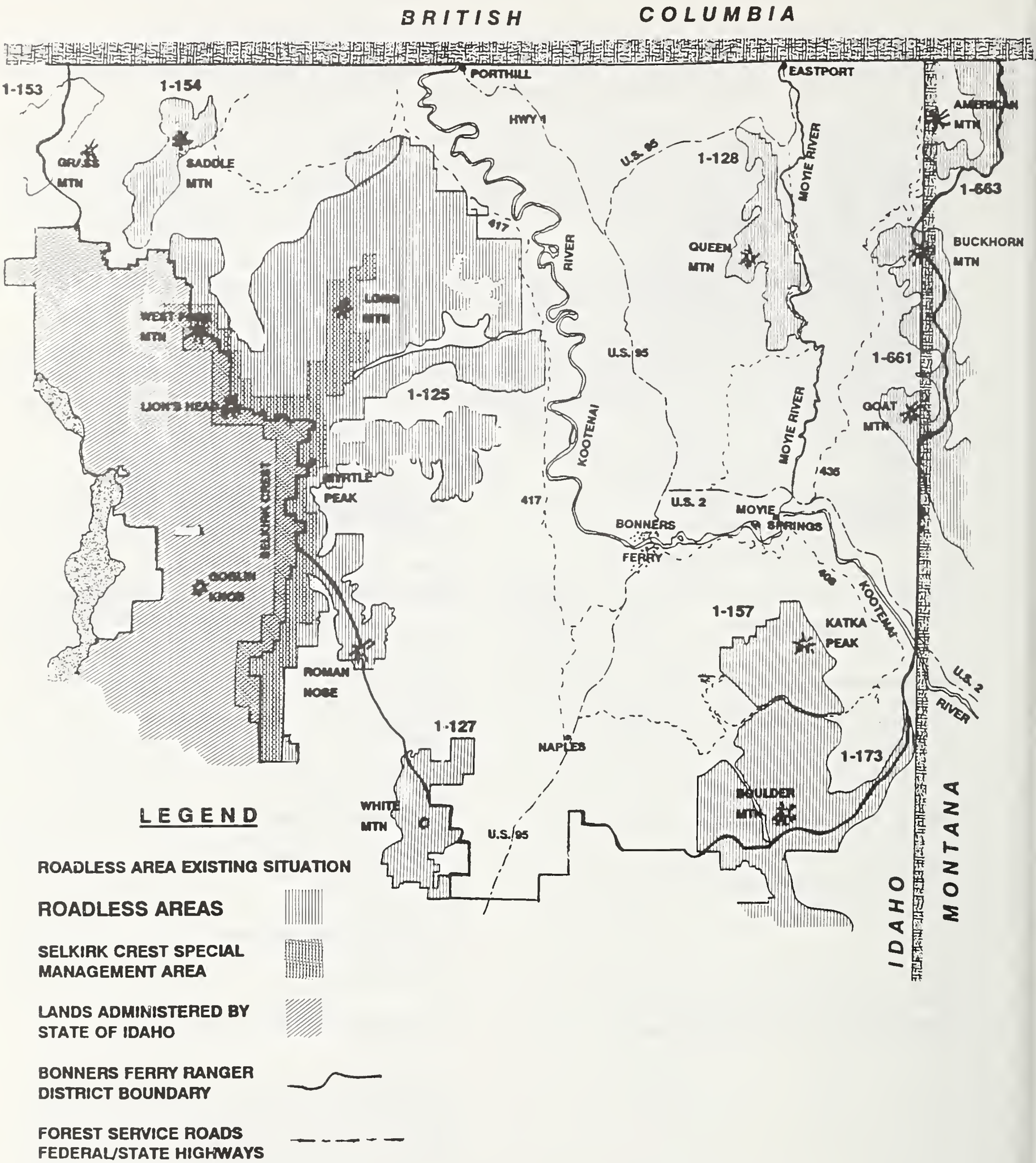
TABLE 3-2
BONNERS FERRY RANGER DISTRICT ROADLESS AREAS
(Thousands of Acres)

BFRD = amount on the Bonners Ferry Ranger District
TOTAL = amount within the Specified Roadless Area

ROADLESS AREA	BFRD	TOTAL
1-153 Continental Mtn	**3.7**	**6.8**
1-154 Saddle Mtn	**8.6**	**8.6**
1-125 Selkirk *	**81.2***	**99.6**
1-128 Hellroaring #	**8.8#**	**8.8**
1-663 Northwest Peaks	**5.7**	**13.6**
1-661 Buckhorn Ridge	**9.6**	**22.0**
1-157 Katka Peak	**12.4**	**12.4**
1-173 Mt. Willard - Lake Estelle	**24.4**	**52.8**
1-127 White Mtn.	**4.3**	**7.8**

Total Roadless Area - Bonners Ferry R.D.
134.3

* Acreage has been reduced from the 1987 inventory figures to adjust for lands affected by the 1990 Trout-Fisher Timber Sale. The Selkirk Crest Special Management Area includes the high elevation portion along the western edge of this area.
# Acreage has been reduced from the 1987 inventory figures to adjust for lands affected by the Hellroaring, Upper Hellroaring, and Little Hellroaring Timber Sales and four sales of less than 35 acres each.



District-Wide Roadless Area Map
FIGURE 3-3

INTRODUCTION

This discussion of current roadless/wilderness values is tiered to the Forest Plan Draft and Final EIS and Appendix C of the Forest Plan Draft EIS. Since the Forest Plan roadless area analysis was completed, a portion of the Hellroaring Roadless Area has been developed. The roadless area now encompasses approximately 8,800 acres, Figure 3-3.

The changes were:

Sale Name	Date	Roadless Area Affected
Daylight	3-15-82	15 acres
Queen Mountain	10-01-80	25 acres
Townsite	8-22-83	245 acres
Upper Hellroaring	5-05-81	450 acres
Little Hellroaring	5-05-81	1640 acre
Hellroaring	5-05-81	20 acres
Tombstone	8-05-81	35 acres

Forest Plan EIS Information Summary

Very few site-specific comments were received during the Forest Plan Draft EIS comment period (10 site-specific comments out of a total of more than 2000 individual comments {page C-40, Addendum to Appendices A,B,C of the Forest Plan FEIS}). The Forest Plan Final EIS projected that the Hellroaring Roadless Area would be developed by the end of the first decade {page C-41, Addendum to Appendices A,B,C of the Forest Plan FEIS}. Resources identified as those which would be adversely impacted were: old growth, primitive recreation opportunities, solitude, visual quality, wildlife habitat, and diversity.

Existing conditions of this long, narrow-shaped area hemmed in by considerable human development in the valley, logging roads, minerals exploration and development along the ridge impact the area's natural integrity and appearance and solitude values were limited (Forest Plan Final EIS page III-47). Hiking and horseback riding were the current primitive recreation uses. Wildlife habitat for most animals common to northern Idaho would be found here, except that no recovery zones for threatened and endangered species had been designated. Timber values were good and minerals moderate. No unique features were identified in the Forest Plan (pages C-71 to C-73 of Appendix C to the Forest Plan Draft EIS.

Cumulatively, the Forest Plan FEIS concluded that it was not possible to intensively develop the already roaded area, maintain most roadless areas, maintain certain resource values, and sustain a historic timber harvest. "In order to meet the multiple use objectives of this Forest Plan, a balance must be struck among development activities, protection measures and preservation of our natural amenities. Protection of fisheries/watershed and wildlife resources are a high priority on the IPNF. Continued timber harvest in several roaded drainages would have an adverse effect on these resources. Shifting timber harvest from these sensitive drainages to that portion of the inventoried roadless areas not designated for wilderness and semi-primitive recreation management enables the IPNF to achieve fisheries/watershed and wildlife objectives," Forest Plan page IV-4. The Forest Plan FEIS also predicted 78 percent of the roadless acreage would remain at the end of the first decade (Forest Plan FEIS page IV-3).

Forest Plan Summary for the Hellroaring Roadless Area (0-0128)

Wilderness Characteristics

The Forest Plan Appendix C discussion and the effects to wilderness characteristics disclosed in the West Moyie Final EIS (Chapter 4) focus on the following wilderness characteristics: solitude, natural integrity, primitive recreation opportunities, wilderness manageability, apparent naturalness, unique features. Other values found in this roadless area, such as wildlife, are discussed in separate sections of this FEIS. Please refer to the table of contents.

Vegetation

Field reviews for project-level planning have resulted in several changes/additions to the description in Forest Plan Appendix C, DEIS. Most of the vegetation is a mixture of species. However, some stands of older, pure to nearly pure lodgepole do exist (less than five percent of

the total area). These lodgepole pine stands tend to be more open-crowned, allowing more sunlight to reach the ground.

The mixture of tree species is supported by a variety of soils which tend to diversify the stand characteristics. The stands of trees on more rocky soils tend to have a greater amount of Douglas fir with a heavy brush understory. Stands on north slopes are densely covered with a great variety of trees. North slopes near streams are noticeably cooler and darker below the canopy than stands on the opposite south slopes. Contrasts are often sharply defined.

Landscape

The landscape of the roadless area is dominated by Queen Mountain/Bussard Mountain and associated side slopes, with mostly easterly-facing aspects. Some gently sloping benches are found at the top of the mountain. These quickly give way to moderately steep (30-60 percent) slopes which drop to meet the Moyie River Valley.

A few open areas are found, mostly near the top of the mountains. Much of the area has a dense tree canopy; the density of this canopy varies considerably.

Recreation in the Hellroaring Roadless Area

Existing trail use appears to be light to moderate; this is especially true of the Sidehill Trail No. 415 and the Bussard Mountain Trail No. 32. Use on the Rutledge Creek Trail No. 152 in the vicinity of Queen Mountain would be described as moderate. Camping use at Queen Lake appears to be relatively light, apparently due to the lack of fish. Queen Lake is a small, scenic lake surrounded by a dense canopy of trees. It is a place one could come to and find solitude the majority of time.

One unusual, not unique, feature is the hardwood stands of paper birch and aspen which are found scattered below 4,500 feet, especially along the Sidehill Trail No. 415. These stands offer visual and habitat variety from the more common evergreen cover. They also add fall color and the distinctive scents of fallen leaves.

One outfitter/guide permit has been issued for this area. Most of the use is for trail rides on horseback, guided hunting trips, and white water rafting on the Moyie River. Rafters put into the river at the access provided by County Road #34B to Bussard Lake and float downstream to the Moyie Falls dam.

As the higher elevations of this area are approached on Trail 152 or Trail 32, the subalpine forest gives way to mountain meadows and rockfields interspersed with subalpine timber. Clear views into Canada, the Kootenai River Valley, and the Moyie River Valley are possible from Queen Mountain. The views of development (clearcutting, roads, houses, highways) are clearly present but they are not in the immediate foreground, giving some sense of wilderness. The existing primitive roads (of mining origin) are narrow and enclosed by the tree canopy. They receive only light use. The lack of cutting adjacent to these roads, along with the overtopping tree canopy, gives these roads a "country lane" character.

Some motorized use (4-wheel-drive and motorcycles) occurs. This experience is probably enhanced by the general lack of development in this area. This use is limited to the old mining roads and a few sections of trail and is at a level where most other users would not be aware of it except for the occasional tire tracks.

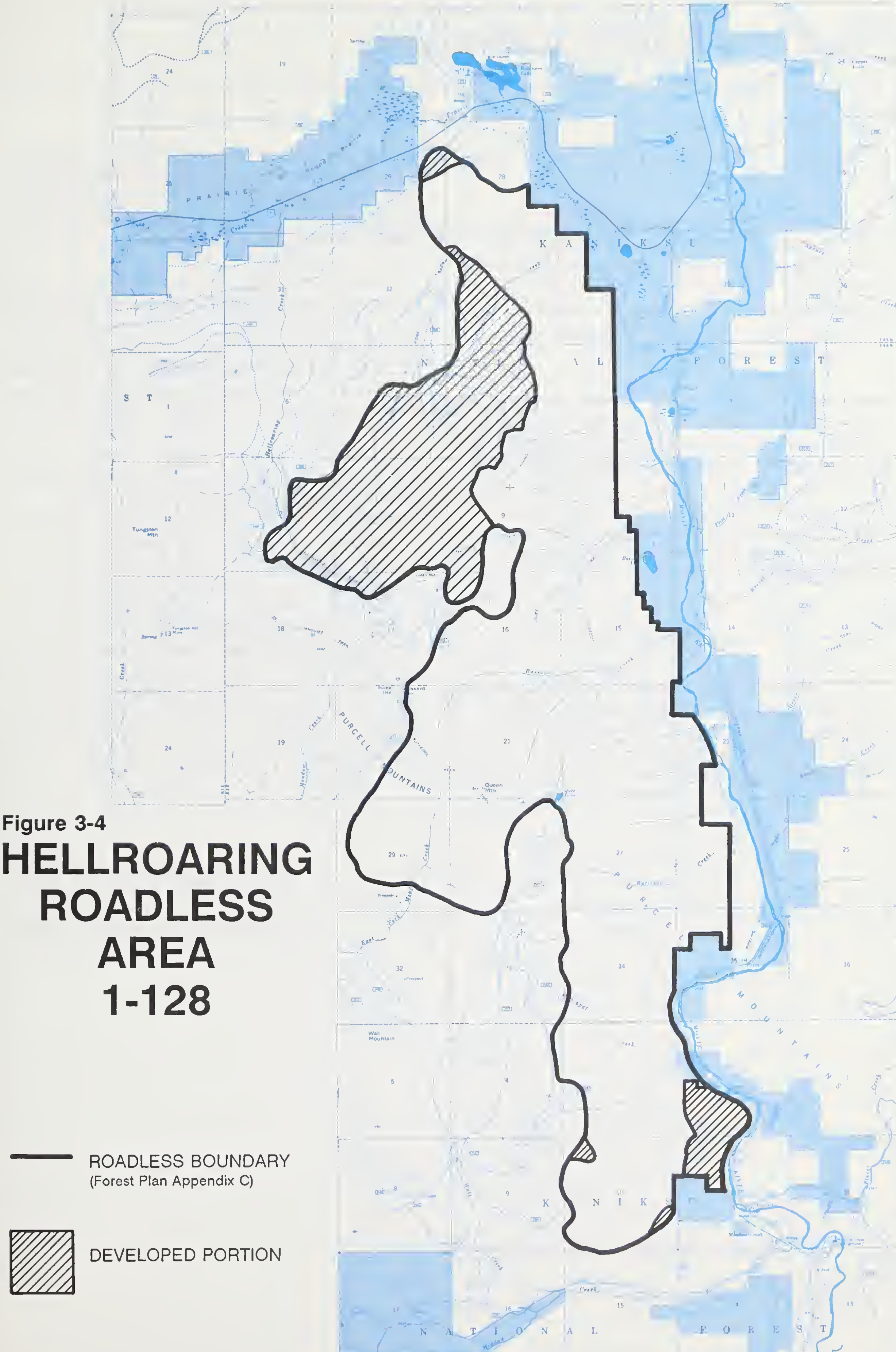


Figure 3-4
HELLROARING ROADLESS AREA 1-128

INTRODUCTION

The total acreage within the Decision Area is 20,673 acres. A north-south trending ridge line bisects the unit into several smaller sub-watersheds feeding into the Moyie River. The highest point is Queen Mountain at 6112 feet. The lowest point is 2406 feet, near the mouth of Meadow Creek at the Moyie River.

The area's climate is typical for Northern Idaho and reflects a strong maritime influence of occasional heavy rains or snowfall. Seventy percent of the precipitation is received between October and April. Amounts range from 24 inches at the valley floor, to over 40 inches near the major ridge. Summers are fairly dry, but frequent local thunderstorms can occur over the area (USDA Forest Service, 1978).

PROJECT SCOPE

The relationship of the Decision Area to the Moyie River drainage area upstream is minor in scale. The total upstream basin area size above Meadow Creek is 437,590 acres, including 72,793 acres in the United States. The 18,626 acres in the Decision Area represent only four percent of the total area above Meadow Creek. In terms of basin inputs, the West Moyie sub-watersheds represent a very small contribution segment with the potential to affect downstream beneficial uses.

There are no "Stream Segments of Concern" or "Outstanding Water Resources", as defined by the State of Idaho, located within or adjacent to the Decision Area. The Moyie River for its entire length in the United States was evaluated for nomination as a "Stream Segment of Concern". However, the river was not selected for inclusion into the program.

The Decision Area is comprised of several north and east facing drainages and facing slopes which drain into the Moyie River, Meadow Creek, or Round Prairie Creek. Meadow Creek and Round Prairie Creek drain into the Moyie River. The Decision Area was divided into thirteen smaller sub-basins to confine certain analysis criteria to manageable watershed units. All of these sub-basins are headwater type drainages that contribute to the Moyie River. Several of the sub-basins are partially outside of the Decision Area; see map Figure 3-5. The following table displays the sub-basins' natural and existing conditions. The R1R4 model, described in Chapter 4, was used to predict sediment and water yield outputs.

Figure 3-5

WATERSHED SUB-BASINS

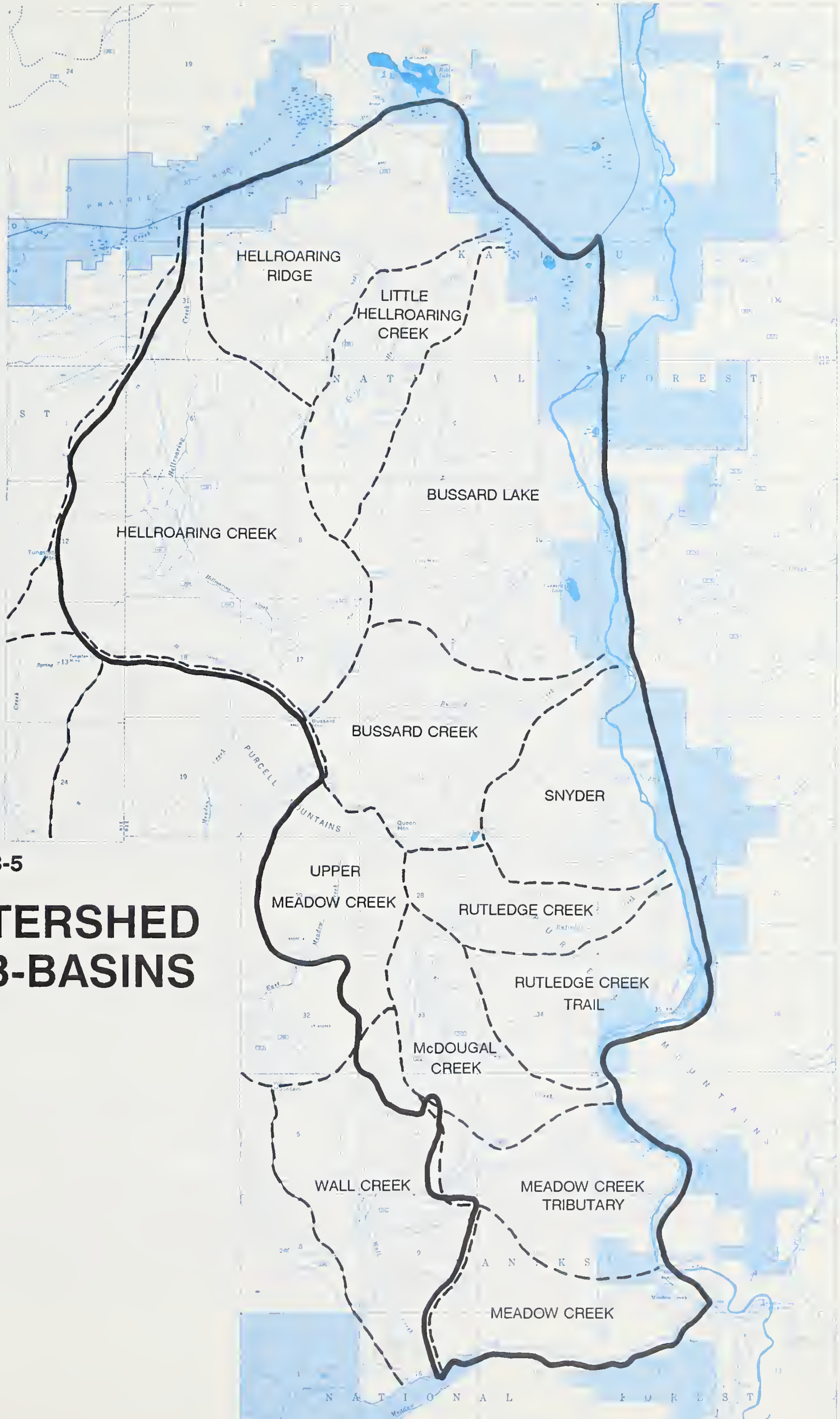


TABLE 3-1

WATERSHED SUB BASINS PRESENT CONDITIONS

SUB BASIN NAME	ACREAGE	{1} SOIL EROSION & HAZARD POTENTIAL	NATURAL RUNOFF (Acre Feet)	NATURAL SEDIMENT	{2} PAST ACTIVITY	PREDICTED EXISTING RUNOFF	PREDICTED EXISTING SEDIMENT
Hellroaring Ridge	2225 Ac	25% Mod 4% Hi	3325 AF	12 Ton	8.4 Mi Rd 425 Acre	3510 AF	15 Ton
Hellroaring Creek	3931 Ac	25% Mod 1% Hi	6244 AF	12 Ton	13.0 Mi Rd 834 Acre	6615 AF	15 Ton
Little Hellroaring Creek	1105 Ac	15% Mod 5% Hi	1747 AF	14 Ton	4.7 Mi Rd 197 Acre	1868 AF	18 Ton
Bussard Lake	3197 Ac	45% Mod 5% Hi	5019 AF	18 Ton	5.3 Mi Rd 147 Acre	5108 AF	20 Ton
Bussard Creek	1561 Ac	35% Mod 10% Hi	2420 AF	17 Ton	Primitive Rd 0 Acre	2420 AF	17 Ton
Snyder	1154 Ac	25% Mod 40% Hi	1758 AF	27 Ton	Primitive Rd 0 Acre	1759 AF	27 Ton
Upper Meadow Creek	4574 Ac	10% Mod	7698 AF	12 Ton	14 Mi Rd 180 Ac	7827 AF	14 Ton
Rutledge Creek	734 Ac	40% Mod	1149 AF	20 Ton	0.6 Mi Rd 145 Acre	1187 AF	20 Ton
Rutledge Creek Trail	1189 Ac	15% Mod 30% Hi	1798 AF	27 Ton	3.3 Mi Rd 70 Ac	1802 AF	28 Ton
McDougal Creek	998 Ac	15% Mod 34% Hi	1516 AF	25 Ton	5.5 Mi Rds 117 Acre	1571 AF	30 Ton
Meadow Creek Tributaries	1270 Ac	25% Mod 15% Hi	1815 AF	23 Ton	3.4 Mi Rds 98 Acre	1839 AF	24 Ton
Wall Creek	1830 Ac	None	2821 AF	13 Ton	7 Mi Rds 477 Acre	2958 AF	15 Ton
Meadow Creek	1180 Ac	25% Mod 5% Hi	1677 AF	10 Ton	5 Mi Rds 406 Acres	1708 AF	12 Ton

{1} EXPRESSED AS A PERCENTAGE OF THE WATERSHED
{2} MILES OF ROAD AND ACRES OF HARVEST ACTIVITY
ACRE FEET: an amount of water that covers one acre of land to a depth of one foot.

SEDIMENT: Tons per Square Mile per Year
SOIL EROSION & HAZARD POTENTIAL:
Hi = High Mod = Moderate Lo = Low

THE MOYIE RIVER

The Moyie River forms the eastern boundary of the Decision Area. It originates in Canada, 63 river miles from the U.S.-Canadian border. The drainage area in Canada is approximately 364,800 acres, or 83 percent of the land area above the Meadow Creek confluence, which is the southern boundary of the Decision Area.

The Moyie River in Canada

The Canadian segments of the Moyie River are influenced to a great degree by a wide variety of land uses and installations.

The most wide spread land use is for wood fiber production. Large portions of the land is under public ownership administered by British Columbia's Ministry of Forestry. Significant portions of the drainage have been harvested or are planned for harvest.

Transportation facilities also have significant influences upon the watershed. Key facilities are the trans-Canadian highway and railroad which parallel the river from the international border to the headwaters above Moyie Lake. A major natural gas pipeline also parallels the river. The Nicola-Cranbrook 500 k.v. electricity transmission line crosses the drainage on a west to east heading paralleling the upper segments of the Moyie headwaters.

Private residences and several smaller communities are concentrated within the river corridor. Two Provincial parks with a total of 90 developed recreational sites are located within a short distance of the river.

There is a minor amount of agricultural activity, mostly along the river. Small cleared openings and some natural meadows are utilized for pasture or hay production for livestock.

Mining activity has been sporadic within the drainage. Although there has been mining of lode and placer deposits in the past, mineral entry mostly disappeared as an active land use prior to 1976.

The Moyie River in the United States

Physical Characteristics

The U.S. segment of the Moyie River has two distinct reaches. From Canada to Meadow Creek, the river runs in a fairly consistent pattern of uniform depth and velocity. There is less than desirable physical habitat diversity in this reach.

The upper reach of the Moyie River is wider and shallower, and bed material size is more uniform than might be expected. This is due largely to historic log drives on the river with associated "stream improvements". Common "improvements" included blocking of sloughs, swamps, low meadows, and banks along wide sections with log cribbing to keep the mix of water and logs in the main channel and blasting or removal of boulders, logs, debris, and encroaching riparian vegetation to prevent log jams (Schmal and Wesche, 1989). These log drives occurred in the early 1900's (see project file). Another factor is the glacial geology of the area. This channel was once was a major proglacial meltwater sluiceway and outwash plain which may explain the size distribution and roundness of the gravel and cobble in the river.

As seen during field observations, large cedar stumps along the river and the existing cedar understory in the second growth timber stands in the river valley suggest that historically adequate large woody debris recruited to the river. These old-growth cedar groves were lost with the development of the river valley prior to the establishment of the National Forest. The large trees were cleared for homesteads or were burned when the drainage burned around the turn of the century. As a result, large woody debris recuritment to rearmor the river banks and provide fish habitat diversity is lacking.

Field observations did not identify any fresh point or central bars in the river. No significant cut banks or other indications of instability were observed. Tractive force calculations at bankfull discharge indicate that the channell bed material is probably stable under the present flow regime. A bedload problem does not currently exist in the river. The channel stability of the river has recovered from the impacts of turn of the century development while fish habitat diversity has remained low.

Below the mouth of Meadow Creek the Moyie River gradient steepens and the flood plain becomes more confined. Fish habitat in this section is much more diverse and is typified by deep pools interspersed with pocket water, short runs and riffles. The river is deeply incised into the surrounding terrain and the channel is bedrock controlled.

River Management

The Moyie River has been studied for inclusion under the Wild and Scenic Rivers Act of 1968, as amended, as a recreational and scenic river. The Moyie River Wild and Scenic Rivers Final Environmental Statement and Study Report was submitted to the Secretary, United States Department of Agriculture (USDA Forest Service, 1978). On June 14, 1982, the Secretary of Agriculture made the following recommendation to the President of the United States: "Based on the river evaluation, the analysis of alternatives, and the public input, it was concluded that the Moyie River should not be recommended for addition to the National Wild and Scenic Rivers System".

Environmental river management area values considered include (USDA Forest Service, 1978):

1. Retention of free-flowing Rivers.
2. Retention of undeveloped beaches and shorelines.
3. Retention of esthetics and undeveloped landscapes (beyond shorelines).
4. Maintenance or improvement of water quality.
5. Maintenance or improvement of fish and wildlife habitat.
6. Maintenance of native plant communities.
7. Avoidance of accelerated erosion and soil loss.
8. Protection of scientific, geologic, historic, and archeologic features.

These values are addressed in the various resource sections in Chapter 4.

The action proposed to the Secretary of Agriculture to ensure that the above values are maintained include:

- Boundary County would provide a river protection program on private lands by instituting flood plain zoning within the 100-year flood plain and other zoning outside of the flood plain.
- National Forest Land Management Planning would provide management and protection of river management area values on National Forest system lands.
- State planning would provide similar management and protection on State land.

The Moyie River Dam is located about one river mile above the confluence of the Moyie and Kootenai Rivers. The dam is operated for hydroelectric power by the City of Bonners Ferry and impounds roughly one mile of reservoir in a confined, narrow canyon. This reservoir serves as a sediment trap. In August of 1984, the operators of the system accidently flushed the deposited sediment out of the reservoir and into the Kootenai River system. This sediment was deposited up to one meter deep in places.

Water Quality

The Moyie River system supplies water for beneficial uses including: domestic water supply; agricultural water supply; cold water biota; salmonid spawning; and recreation (Idaho, DHW, 1988). Hydro power generation is also another use, although not listed as such by the State of Idaho Water Quality Status Report.

Beneficial uses of domestic water supply and salmonid spawning are only partially supported by the water quality. Beneficial uses of cold water biota and recreation are supported by the water quality but potentially at risk to becoming only partially supported. All other beneficial uses are supported at existing water quality levels (Idaho, DHW, 1988, appendix A).

The major source of nonpoint sediment production for the river segment from the Canadian Line to the dam is agriculture (Idaho, DHW, 1988, appendix B).

Annual Water Flow

The Moyie River discharges an average of roughly 502,000 acre-feet per year into the Kootenai River. This is about four percent of the flow of the Kootenai

River at Porthill, Idaho. Approximately 73 percent of the flow of the Moyie comes from the Canadian portion of the basin.

About three-fourths of the annual flow of the Moyie River occurs in the period April 1 through June 30. Most of the floods that occur are in early May as a result of snowmelt. By mid-June the river is usually in recession, progressing to base flows by the middle to the end of July. The stream flow records indicate that rain on snow is not a significant source of flooding in the Moyie River. After recession has begun, summer rainstorms do not cause rapid fluctuation in the river flows.

Other than the dam operated by the City of Bonners Ferry, there are no storage reservoirs or significant diversions in the basin. Moyie Lake in Canada provides some natural regulation to dampen rises in flow.

CONSUMPTIVE USES

Upper Meadow Creek supplies surface water to the Beeline Water Association, a small public supply serving approximately 121 unmetered, rural, year-long membership residences with a population of approximately 360 persons. Water demand from the facility (filter plant) averages 70,000 gallons per day (gpd) year round and increases to 220,000 gpd during the peak demand period.

The quality of the raw water prior to its treatment by the Beeline Water Association is "considered extremely pristine" (Tanner, 1987). Measured turbidity averaged 0.1-0.4 NTU, and increased to 1.2 NTU during periods of heavy runoff. The standards for treated water from a slow sand filter treatment, the same as the Beeline's system, is 1.0 NTU. Slow sand filters are very effective at filtering micro-organisms if turbidity levels of the raw water are kept at or below the State of Idaho turbidity threshold levels.

The largest contributing factor that would increase maintenance/treatment costs for the Beeline Water Association system is sediment production. Increased sediment production would result in an increase in the frequency of filter cleaning by the water association (Tanner, 1990).

The State of Idaho has proposed turbidity standards for raw water supplied to water systems. For drainages with a natural background turbidity of 50 NTU or less, nonpoint source activities (road construction and timber harvesting) shall not increase turbidity at the water supply intake by more that 5 NTU above natural background at comparable discharge (Idaho DHW, 1989).

Estimated 1991 water yield from Upper Meadow Creek is 7827 acre-feet. This is more than enough to meet the yearly needs of the Beeline Association. However, the primary needs and the peak demands occur when the natural watershed produces the least amount of water. Especially in dryer years, certain cutback measures are enacted to conserve water distribution and use (McGraw, 1990).

Three Mile and Moyie Springs water systems drew their water directly from the Moyie River, just below the Moyie Springs dam, at the time the reservoir was flushed. The flushing of sediment caused severe problems for these water systems. The Three Mile water system has subsequently drilled surface water wells adjacent to the river and no longer has major problems with seasonal fluctuations in turbidity. The system does experience a noticeable increase in turbidity during spring runoff, however the water quality is still high. The system is planning to drill deeper wells to get away from the surface water classification (Brink, 1990). The Moyie Springs system still draws water from the river, they cannot meet the Idaho DEQ turbidity standards during spring runoff, so they switch over to the three mile well system during this time period (Tanner, 1990). The Moyie Springs System managers are currently drilling wells similar to those being considered by the three mile system. Since these will be subsurface water wells, the system does not expect to encounter any problems with seasonal fluctualtions in turbidity (Carpenter, 1990).

Two families obtain their domestic water supply from two locations within the Decision Area, other than the Beeline system. One of these systems is located in Bussard Creek and the other in an unnamed drainage in the center of section 3, T64N, R2E, B.M. Neither system is known to be treated by anything other than some method of initial filtering.

NON-CONSUMPTIVE USES (Fisheries)

West Slope Cutthroat trout has been selected as the Management Indicator Species (MIS) for West Moyie. This species is listed as being sensitive by Region 1 of the U.S. Forest Service. The IPNF Forest Plan (Appendix P) identifies East Fork of Meadow Creek as containing a pure strain of West Slope Cutthroat trout. A study of cutthroat trout streams found that the West Slope Cutthroat trout in East Fork of Meadow Creek were from 1/3 to 1/2 hybridized (Wallace, 1979). Upper Hellroaring Creek could also contain West Slope Cutthroat trout, although it was not studied with the 1979 study.

A report by the Idaho Department of Fish and Game (Horner, 1985) states there are two distinct management opportunities in the Moyie River. From Eastport to Meadow Creek the river lacks sufficient spawning and rearing habitat to support an abundant wild rainbow trout population. Sportsman access is good. This reach is managed as a put and take fishery. Fish Habitat in the canyon section from Meadow Creek to the Moyie dam is much more diverse and supports a moderate wild trout fishery.

An integrated program of stream improvements has been initiated (boulder placement to provide habitat diversity and river bank stabilization) on the upper section of the river. The purpose of this habitat improvement program is to reintroduce habitat diversity lost due to turn of the century activities in the drainage. This project is being coordinated between the Idaho Dept. of Fish and Game, the Forest Service, and private property owners along the river. Pacific Gas Transmition Company will also become active in fisheries habitat improvement in conjunction with their construction of an additional pipeline in the valley.

Moyie River and tributary spawning and rearing areas between the Canadian line and Meadow Creek are insufficient to support an abundant wild trout population. Only three of the streams within or adjacent to the Decision Area are considered to have habitat suitable for spawning and rearing, and then only on a limited scale. These streams include: Bussard Creek, Meadow Creek, and Round Prairie Creek (Horner, 1985). Meadow Creek currently contains a blockage to fish migration. The most probable limiting factor for maintaining fish populations in these streams is the amount of pools available for rearing and overwintering of juvenile and adult fish.

In the area, the Idaho Panhandle Forest Plan lists the East Fork of Meadow, Bussard and Hellroaring Creeks as streams having specific fish habitat capacity targets (Forest Plan, Appendix P). The Forest Plan and the Idaho Fish and Game also recognize Round Prairie Creek and Meadow Creek as important spawning streams for the Moyie River.The Idaho Fish and Game recognizes limitations on each of these drainages for fish production potential (Horner, 1985).

The Moyie River, Round Prairie Creek, and Meadow Creek are too large to accurately model for water yield and sediment yield increases. The cumulative effect of managment in sub-drainages in these watersheds, if kept within Forest Plan standards, will not impact the larger drainages to a degree that would be inconsistent with Forest Plan standards.

Upper Meadow Creek (East Fork Included) possesses a relative abundance of high quality spawning and rearing habitat in several of its reaches. A survey completed in 1989 rated channel stability as good as characterized by: stable banks, instream debris sediment trapping, and beds and banks often controlled by bedrock or large boulders.

The grade of the stream varies. With the exception of one reach of 30 to 60 percent gradient, the stream grade is suitable for a resident fish population. Cutthroat trout were observed up to 5000' elevation in the East Fork. Spawning gravel samples were collected and the fine gravels (fines) less than 1/4 inch were separated out from the rest of the sample. The average percent fines less than 1/4 inch was 18 percent, with ranges from six to 26 percent.

At one time Meadow Creek probably produced the majority of trout for the lower Moyie River (Horner, 1985). In 1956 the Spokane International Railroad replaced a trestle-type bridge with a large culvert near the creek's mouth. Installation left the culvert outfall more than eight feet above

the bed of the creek. It has been a total migration barrier ever since. Because of this, 10 miles of good spawning and rearing opportunity is blocked to all but resident trout in Meadow Creek (Horner, 1985).

The Idaho Fish and Game electrofished 30 meters of Meadow Creek 1.5 miles above the railroad culvert in July 1984. Twenty-four brook trout ranging in size from 1.6 inches to 7.9 inches, and 17 cutthroat from 1 inch to 9.8 inch were caught during the survey

With **Bussard Creek**, only the first 1600 feet of stream from its joining with the Moyie River are recognized by the Idaho Fish & Game as providing minimal habitat for fish. Bussard Creek enters the Moyie over an alluvial fan which is probably a partial migration block during low flows, but feasibly allows for passage during higher flows.

A 1985 stream survey described stability as fair, this is the result of natural geologic processes as the stream moves across an aluvial fan. Instream debris are trapping and holding bedload movement. There is lack of any field evidence to indicate a problem with bedload transport. Gravel bars in the Moyie River below the mouth of Bussard Creek have not significantly changed in over 50 years. This was determined from aireal photo review of photos taken in 1936, 1958, and 1983 (see project file) and comparing this to the present appearance of the gravel bars.

Fish habitat parameters are greatly influenced by channel energy gradients which have etched the channel to bedrock or left it with only boulder or larger cobbles within the substrate. Spawning gravels, where they can be found, are usually transient deposits. Several of these types of deposits were sampled and the average of fines less than 1/4 inch was 18 percent with a range from 14 to 38 percent.

In July 1984, Idaho Fish and Game electrofished the first 100 meters of Bussard capturing five cutthroat ranging from 2.3 to 5.5 inches, and five brook trout ranging from 2.3 to 7.5 inches (Horner, 1985).

Hellroaring Creek, a primary tributary to Round Prairie Creek, was surveyed by the Idaho Fish and Game in 1984 and by the Forest Service in 1982. Field reviews by the USFS Region 1, IPNF, and Bonners Ferry Ranger District hydrologists were conducted in 1989. Field reviews were also conducted in 1990 by the IPNF fisheries biologist. The IPNF Forest Plan recognized Hellroaring Creek as having some potential as a resident Sport Fishery. However the surveys suggest the energy budget of Hellroaring limit habitat capability over much of the stream.

Electrofishing in a single pool below Highway 95 in July of 1984 produced three cutthroat averaging nine inches, 51 brook trout ranging in size from two inches to 4.7 inches, and one five-inch rainbow, (Horner, 1985). The pool where these fish were captured was at the mouth of the highway road culvert, considered a block during the low flow period. Also during low flows the lower reach runs intermittent through the substrate deposited as part of the alluvial fan landform.

Hellroaring Creek contains three distinctive reaches. The lower reach of this channel where Hellroaring Creek joins Round Praire Creek is an aluvial fan. The fan was constructed over geologic time from bedload deposition coming out of Hellroaring Creek. A stream may occupy any portion of an aluvial fan over time. In this case, there have been an unusually large number of channel shifts in recent time (last quarter century) as evidenced by the frequency and freshness of abondoned channels. Eash shift was initiated by an episode of great bedload delivery to the fan resulting in plugging of the existing channel and the stream seeking a new channel.

The reach above the aluvial fan is in a well confined valley, channel entrenchment in this reach is very deep. The gradient of the channel is approximately 12 percent in this reach, the stream is a very high energy stream in this location. Evaluation of the geomorphology of this area shows that the channel has been downcutting through a deposit of glacial till or moraine. This is a natural process and has been occuring for centuries. Channel materials are boulders, cobble, and very little gravel. The inner gorge of the valley appears to be very active with numerous active and recovering slides

apparent. These seem to be naturally ocuring due to toe cutting by the high energy stream during high flow events. This downcutting through the glacial deposit is responsible for most of the material deposited on the aluvial fan and the frequent channel shifts.

The third reach of Hellroaring Creek is that portion of the stream above the reach that is downcutting through the glacial deposit. The gradient of this reach averages 6 percent. The stream channel is moderately entrenched and well confined. The channel consists of cobble bed with a mixture of gravel and sand with some small boulders. Fish habitat is more diverse in this reach consisting of high and low gradient riffles, debris formed pools and some runs. Bedload movement does not appear to be a problem in this portion of the drainage. Spawning gravel is locally abundent.

Potential spawning gravels sampled on the aluvial fan and in the upper reach of the drainage in the fall of 1989 tallied an average of 19 percent fines. The range was 12 percent to 33 percent. Small fingerling size trout were observed in a gravel deposit at 4025 foot elevation.

INTRODUCTION

Extensive timber management activities within the Decision Area started in the early 1960's in the vicinity of Queen Lake. Since then, timber harvesting has taken place in the Hellroaring Creek and Little Hellroaring Creek areas. The majority occured in the 1980's and is scheduled to be completed in 1991. Harvest units were predominantly clearcut and seed tree. Units harvested in the 60's and 70's were very large, between 100 and 200 acres. Units harvested in the 80's, with the exception of three units, were all under 40 acres.

The Decision Area visual resource contains distinctive landscapes, mainly within the Moyie River Corridor. Distinctive landscapes refer to areas where features of landform, vegetative patterns, water forms, and rock formations are of unusual or outstanding visual quality. This landscape contains the river; a wide range of vegetation along the river, including meadows, mixed conifer stands, cottonwood and aspen; small lakes; boulder outcrops and cliffs; and private residences.

View of Decision Area looking south near mile post 534 on Highway 95

CURRENT SITUATION

The Decision Area is viewed from several critical viewpoints (IPNF Forest Plan, Appendix D). These viewpoints were identified following the procedures outlined by the National Forest Landscape Management System (USDA Forest Service, 1974).

Sensitivity levels were established for these viewpoints to enable the development of VQO's (discussed on page 3-26). The sensitivity level determinations were based on the importance of the travel route, use area, or water body and the percentage of the forest visitors that would have a major concern for the scenic quality. The sensitivity level is a numerical rating. Level one has the highest sensitivity, level two average, and level three the lowest.

Sensitivity level one viewpoints considered include: Highway 95, the community of Bonners Ferry, Kootenai River, Moyie River, Robinson Lake Campground, and Meadow Creek Campground. Sensitivity level two viewpoints include the Meadow Creek (Moyie River) Road. Sensitivity level three viewpoints include all other trails and roads within or adjacent to the Decision Area that offer viewing opportunities of the Decision Area.

VIEWPOINT DESCRIPTIONS

Highway 95

Highway 95 is an important travelway. It is the only north-south highway in western Idaho and receives heavy recreational traffic. Both locally bound recreationists and travelers crossing the USA-Canadian international border rely on this highway.

Most land along the highway is private property with residential development. Residents in the Round Prairie and Moyie River drainages have indicated that Visual Resources are of primary concern to them (project public involvement file). Portions of the Decision Area can be viewed from various locations along Highway 95. The area around Queen Mountain can be viewed intermittently from Highway 95 south of Bonners Ferry. This view distance varies from approximately 40 miles at Pack River to 20 miles at Paradise Valley.

View of Queen Mountain, East Fork Meadow Creek and Tungsten Ridge near Highway 95, five miles south of Bonners Ferry.

At this distance, the important elements of visual resources are form and line of the natural landscape and shapes created by managment activities and the color contrast of the winter snow cover. Two large clearcuts can be viewed from this viewpoint. One adjacent to the Decision Area is very large and is a dominant characteristic in the landscape, especially in the winter. It has recovered to the point however, that some color contrast is provided by the regeneration so that it doesn't appear as a snow field all winter. The edges are shaped so that there are few straight lines. Given the recovery that has taken place, it should appear as a natural occurance within another 10 years or less.

The second old clearcut that can be viewed from this location is just south of Queen Lake. The unit is large, but with leave islands and no visible straight lines, it appears as a natural occurance from this distance. Vegetation has recovered to the point that color contrast in winter months is no longer sharply defined.

The northern end of the Decision Area is viewed along Highway 95 from the Mission Creek-Round Prairie Creek divide to the Canadian Line. Recent harvest activities in Hellroaring Creek have introduced geometrically shaped clearcuts and seed tree cuts on hillsides that were predominately dense timber stands with little variety.

The viewing distance is less than two miles. All elements of visual resource management are important at that range, including: form, line, texture, and color. The units dominate the landscape and do not appear as natural occurrences.

Bonners Ferry

The view from the community of Bonners Ferry is important to residents who value the scenic quality of the surrounding area and to travelers who pass through on Highway 95. The view is much the same as that from the highway south of town, only with a greater viewing angle.

Portions of the same harvest units in the vicinity of Queen Mountain and Queen Lake can be seen from the community, the viewing distance is approximately 16 miles. Harvesting's effect on the landscape is the same as described above.

Kootenai River

Recreationists are the primary users of the Kootenai River. Historically, this group is concerned with visual quality.

Queen Mountain, East Fork of Meadow Creek, and Tungsten Ridge can be seen intermittently from the Kootenai River. The view distance is approximately 10 miles from various locations along the river from Bonners Ferry to Copeland.

Moyie River

As with the Kootenai River, recreationists are also the primary users of the Moyie River. This group has long been concerned with visual quality. In addition residents along the river have indicated that the visual resource is the issue of prime concern to them.

With a few exceptions, most of the land within the Decision Area can be seen from locations along the river. The view is generally of an undisturbed mountain range with dense forests interspersed with natural openings. These openings are of various sizes and are located on the steep face to the river and on the peaks and higher ridges and provide diversity in the view. From specific locations the view can be quite spectacular.

Moyle RIver Road

The view from the Moyie River Road is practically the same as the view from the river. The road receives heavy recreational use to access the river, trails, campgrounds, and the National Forest. Local residents also use the road for access.

Meadow Creek Road

The Meadow Creek Road, Highway 95, Highway 2, and the Moyie River Road form a loop system around the Decision Area. Meadow Creek Road receives recreational traffic to access campgrounds, trails, the Moyie River, and the National Forest. Local residents use the road to reach their property. A heavy amount of logging traffic also uses the road.

The Meadow Creek Road forms the southern boundary of the Decision Area. Where this road leaves the Moyie river, the canyon is narrow and the road lined with dense timber, obscuring any view of the Decision Area.

Approximately three miles up the creek, the canyon bottom widens into a large meadow of several hundred acres.

From this meadow one can see the steep slopes on the southern end of the Decision Area. No harvesting is visible within the Decision Area, but portions of the large unit seen from Bonners Ferry can be observed. The management activities evident in this view do not dominate the landscape. They appear as a natural occurrence from this viewpoint.

VISUAL QUALITY OBJECTIVES

Management direction for visual resources is in the form of Visual Quality Objectives (VQO's). Sensitivity levels discussed earlier, land and vegetation variety classes and the distance between the landscape and the viewer all influence the development of VQO's. (See the National Forest Landscape Management System for application procedures). The VQO's for the Idaho Panhandle National Forest were developed as a portion of the Forest Planning Process. VQO's for the Decision area are displayed in Figure 3-6 VQO MAP, page 3-27.

The VQO's associated with the viewpoints (VP) for the Decision Area include:
-**Sensitivity level one** VP: Retention and Partial Retention;
-**Sensitivity level two** VP: Partial Retention and Modification;
-**Sensitivity level three** VP: Modification.

Management activities are designed to meet these VQO's when viewed from the established viewpoints. Activities designed to meet a VQO of Partial Retention when viewed from Highway 95 may also be visible from another viewpoint, i.e. another road or trail that is a sensitivity level three viewpoint. The activity may be more obvious from this level three viewpoint, and should meet the VQO associated with that viewpoint (modification).

The definitions of the VQO's applicable to the Decision Area include:

- **Retention -** provides for management activities which are not visually evident to the casual forest visitor.

- **Partial Retention** - Management activities may be visible but remain subordinate to the characteristic landscape and appear as a natural occurrence.

- **Modification** - Management activities may dominate the characteristic landscape, but must borrow from naturally established form, line, color, or texture.

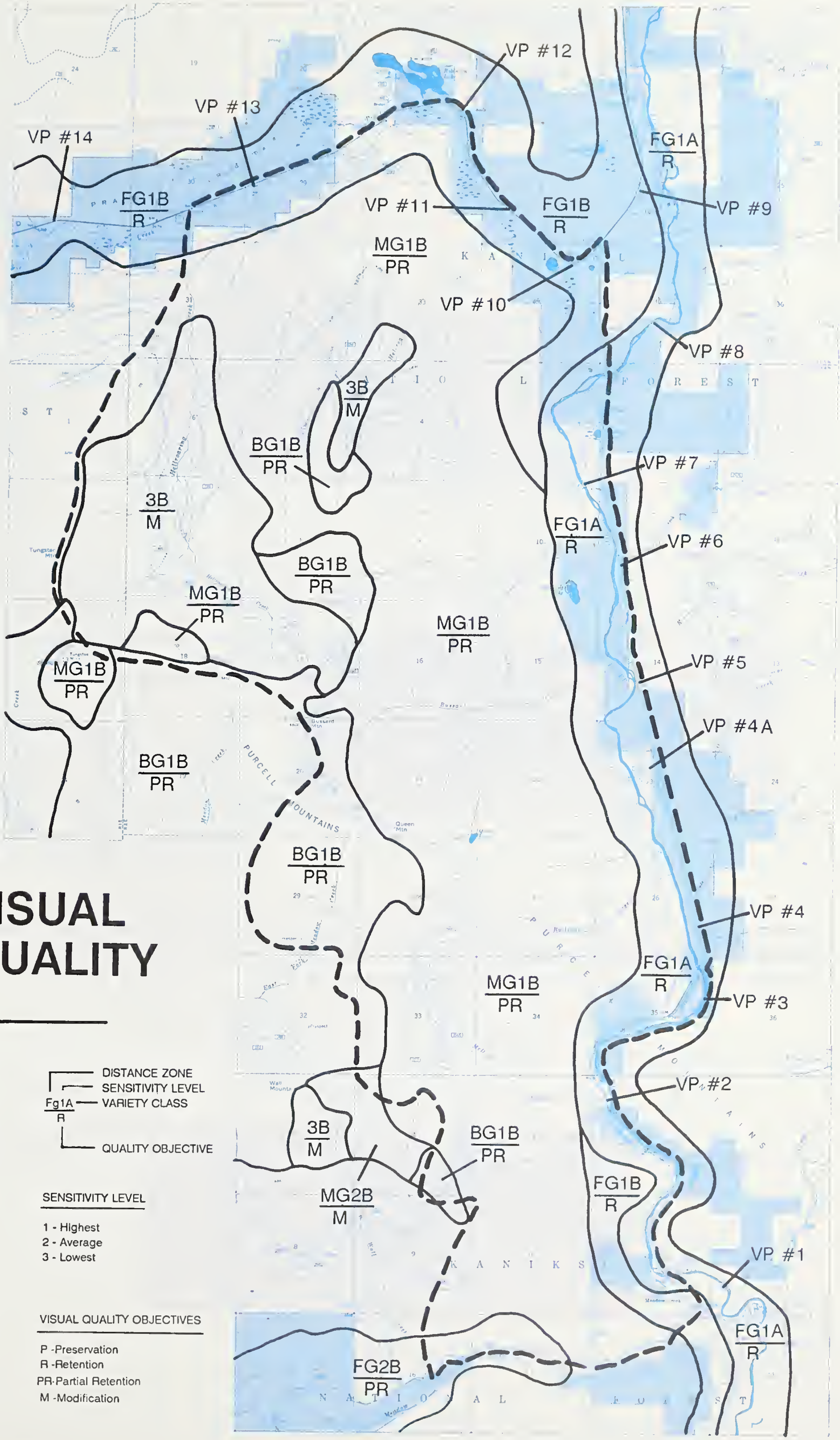


Figure 3-6

VISUAL QUALITY

DISTANCE ZONES

Fg-Foreground
Mg-Middleground
Bg-Background

DISTANCE ZONE
SENSITIVITY LEVEL
Fg1A — VARIETY CLASS
R
QUALITY OBJECTIVE

VARIETY CLASS

A -Distinctive
B -Common
C -Minimal

SENSITIVITY LEVEL

1 - Highest
2 - Average
3 - Lowest

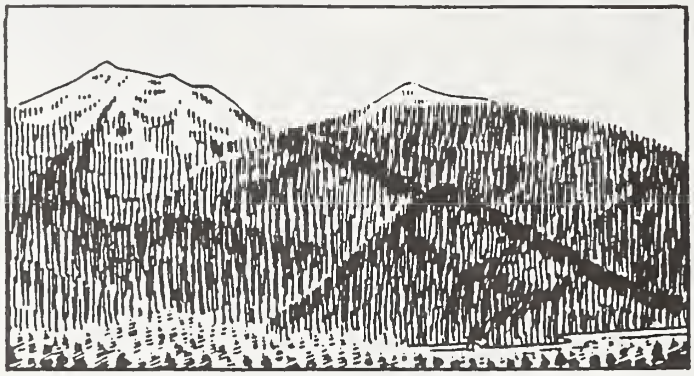
OTHER SYMBOLS

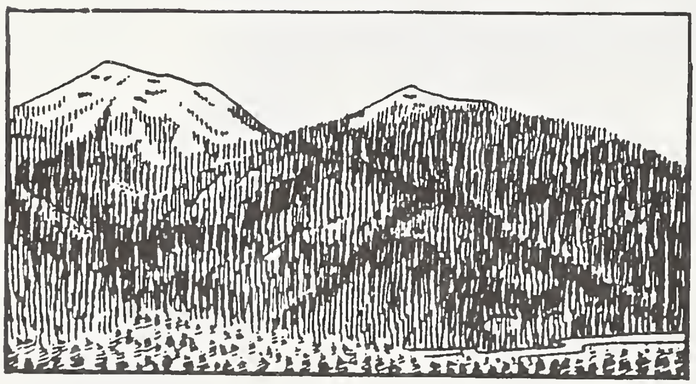
VP -View Point

VISUAL QUALITY OBJECTIVES

P -Preservation
R -Retention
PR-Partial Retention
M -Modification

Preservation



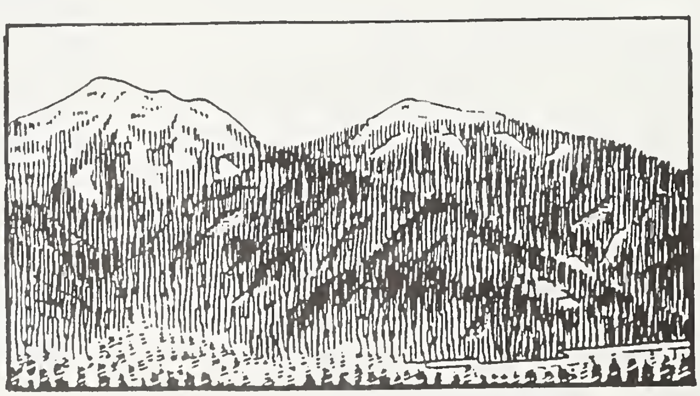


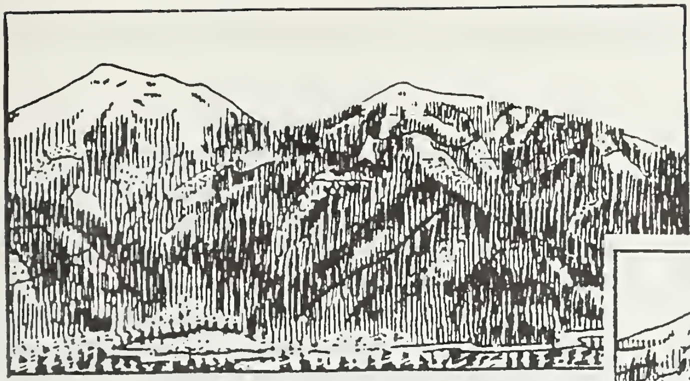
Retention

The VQO's of Retention and Partial Retention are considered the most sensitive because of their association with important viewing areas that can be affected by forest management activities such as timber harvesting and road construction.

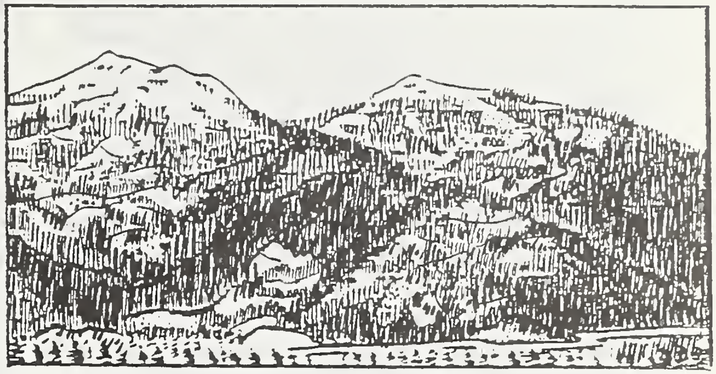
Whether or not these VQO's are met for a specific project is determined in a subjective manner based on how the casual forest visitor views the National Forests. Management activities that meet Forest Plan VQO's while acceptable to the casual forest visitor may be more obvious and unnacceptable to residents who live in this area and view the Decision Area on a daily basis.

Partial Retention



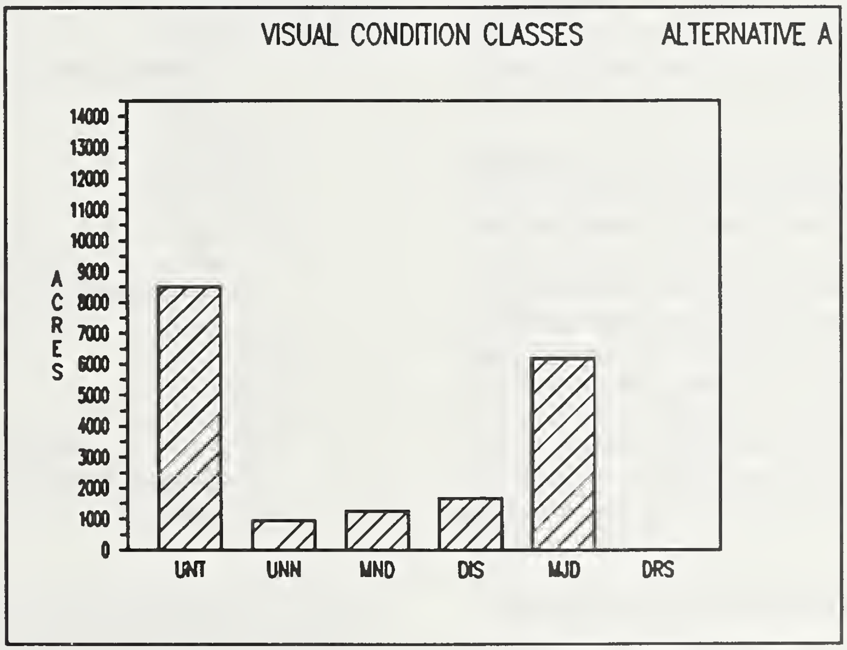


Modification



Maximum Modification

The following chart displays the existing visual condition of the Decision Area.



UNTC = UNTOUCHED, UNNO = UNNOTICED, MND = MINOR DISTURBANCE, DIST = DISTURBED, MAJD = MAJOR DISTURBANCE, DRS = DRASTIC DISTURBANCE

FIGURE 3-7

EXISTING VISUAL CONDITION CLASS

While VQO's are inherently an "objective" to be met, Visual Condition assessments are an estimate of the on-the-ground visual resource and are expressed as acres of Existing Visual Condition Class (EVCC). They are an expression of the level of disturbance to the visual resource and are labeled Untouched, Unnoticed, Minor Disturbance, Disturbed, Major Disturbance, and Drastic Disturbance (see glossary for definitions).

The primary purpose of the EVCC is to give the decision maker the information necessary to compare the predicted future visual condition of the landscape for each alternative against the existing visual situation.

CONSISTENCY WITH FOREST PLAN

Forest Plan VQO's of Partial Retention have not been met in the Hellroaring Creek Area. The midslope geometrically shaped units in dense timber stands dominate the landscape where they should be subordinate to the landscape as viewed from Highway 95. In areas where the EVCC has a greater disturbance than Forest Plan VQO's, there is an inconsistency with the Forest Plan. The area has been identified for visual resource rehabilitation.

It will take approximately 20 years for regeneration to obtain sufficient size to soften the effect of the Hellroaring units. Feathering or reshaping the edges of the units would help the recovery process in the long run. However, due to the size and location of the units, rehabilitation work would not result in meeting the VQO's immediately. This work would help mitigate past impacts to the visual resource by softening the sharp contrasts presently noticable.

INTRODUCTION

This chapter summarizes the legal requirements and management direction for Threatened and Endangered species, Sensitive species, Management Indicator Species (MIS), and ties the analysis to the section on biodiversity presented later in this chapter. It includes discussions of species that live in the mature/old-growth habitat, and big game issues. Those species that were included in the analysis, but eliminated from further discussion because of no impacts or minimal impacts expected within the Decision Area are discussed in Appendix D.

Specific wildlife covered in this chapter are found on the following pages:

Wildlife covered in Appendix D are:

The Decision Area provides habitat for a variety of wildlife. Moose, elk, mule and white-tailed deer are present on some portion on the Decision Area year round and are avidly hunted. Mountain lion and black bear also occur in the area. Furbearers include pine marten and coyote.

The variety of wildlife which utilizes the Decision Area is present because of the diversity of vegetative types which occur there. The elevation change from 2500 feet on the Moyie River to 6100 feet at the summit of Queen Mountain is reflected by a change in plant species composition.

Mixed conifer stands dominate the lower and mid slopes with spruce-fir forests occurring at the higher elevations. Subalpine meadows or parklands occur along the ridge system between Queen Mountain and Bussard Mountain. Lower elevation parklands are scarce. The Chapter 3 section on biodiversity, pages 3-44 through 3-64, discusses animals and plants associated with the diverse habitats of the West Moyie area.

Species typical of the spruce-fir vegetative type include: boreal owl, pine marten, and possibly wolverine and lynx. The relatively continuous tree canopy cover of the existing roadless area provides an expanse of habitat for area-sensitive species, and security habitat for elk and other species.

Riparian zones along the Moyie River and Round Prairie Creek are utilized by white-tailed deer, moose, osprey, and blue herons. These areas are dominated by spirea, alder, and black cottonwood.

Management activities are evident in the Hellroaring Creek drainage at the north end of the Decision Area and south of Queen Lake. Glacial valleys and highways seperate the mountainous portion of the Decision Area from adjacent mountains, effectively isolating the spruce-fir zone from adjacent areas to the north and east. Functional timbered travel corridors are present on the west, south, and east sides of the Decision Area (see Interior Forest Habitat Map, page 3-56). These corridors provide a means for far ranging animals to avoid large openings and utilize habitat in the Decision Area.

THREATENED AND ENDANGERED SPECIES

The Endangered Species Act of 1973, as amended, obligates the U.S. Forest Service to conduct activities and programs which assist in the identification and recovery of threatened and endangered (T&E) plant and animal species. The Bonners Ferry Ranger District submitted a request to the U.S. Fish and Wildlife Service (US F&WS)

for a list of threatened and endangered species that are known to or may occur in the Decision Area. The US F&WS responded on May 24, 1989 that the gray wolf is the only T&E species that may occur in the project area.

District records and available information suggested a need to include the bald eagle, peregrine falcon, grizzly bear, and mountain caribou in the analysis. Based on known habitat requirements and this assessment, the alternatives are not expected to have any measurable impacts on these species. See Appendix D.

SENSITIVE SPECIES

Sensitive species are those species identified by the Regional Forester for which population viability is a concern, as evidenced by:

1. A significant current or predicted downward trend in population numbers or density.

2. A significant current or predicted downward trend in habitat capability that would reduce the existing distribution of a species (Reel, 1989).

District records and available information indicated six Sensitive species to be included in the analysis of the Decision Area. They are the big-eared bat, boreal owl, Coeur d'Alene salamander, common loon, harlequin duck, and wolverine. Of these species, only the boreal owl is expected to be impacted by alternatives and will be discussed in detail in this chapter. Information concerning the current situation and analysis for the other species is in Appendix D. Lynx, a candidate species, is also included in this appendix.

MANAGEMENT INDICATOR SPECIES

Management Indicators are a select group of wildlife species used to monitor the effects of management activities on wildlife populations. The key characteristic of Management Indicator Species is that they are sensitive to management activities. This includes but is not limited to ecological indicator species - organisms that characterize certain environmental conditions (Jerry, 1983).

The implementing regulations of the National Forest Management Act (NFMA) of 1976 require the Forest Service to plan the management of wildlife habitats to "maintain viable populations of existing and desired non-native species in the planning area". To facilitate the management of all the species, NFMA further required each Forest to identify Management Indicator species (MIS) and establish objectives to maintain and improve habitats of these indicator species. The lands covered by the IPNF Forest Plan are used as the base planning area for population viability determination. This is a much larger area than the site-specific Decision Area lands analyzed in this FEIS.

In order to ensure that viable populations will be maintained, habitat must be provided to support at least a minimum number of reproductive individuals, and that habitat must be well distributed so that individuals can interact with others in the planning area (36 CFR 219.19, as defined, planning area is considered to be the area of the National Forest System covered by a Regional Guide or Forest Plan). In addition we are to estimate, on the basis of available information, the effects of changes in vegetation type and year-long suitability of habitat related to mobility of Management Indicator species (Forest Plan, Appendix L, p. L-1).

In the Idaho Panhandle National Forest Plan (Forest Plan), 13 Management Indicator species were identified. They were also classified as belonging to one or more of three categories;

1. species commonly hunted, fished, or trapped,
2. threatened / endangered species, and
3. old-growth dependent species

(IPNF Forest Plan EIS, p. III-58).

These species were selected to represent the needs of many wildlife species inhabiting the forest, especially those most vulnerable to management activities (Table 3-2).

The Management Indicator Species (MIS) identified in the Forest Plan and associated with the Decision Area include elk, white-tailed deer, moose, pileated

woodpecker, goshawk, and marten. Bald eagle, woodland caribou, grizzly bear, and gray wolf are also indicator species because of their threatened and endangered status and their occasional or historic presence. The MIS common to the wildlife issues of big game and mature/old-growth habitat include elk, white-tailed deer, pine marten, and goshawk. All other MIS are discussed in Appendix D.

Table 3-2

WEST MOYIE WILDLIFE INDICATOR SPECIES

	Commonly Hunted, FIshed or Trapped
White-tailed Deer	Most important big game on Kaniksu National Forest. Winter range can be critical.
Elk	Most important big game on the Coeur d'Alene and St. Joe National Forests. Significant economic resource. Easily affected by Forest activities.
Moose	Affected by Forest activities.
Rainbow, Cutthroat and Dolly Varden Trout	Significant economic resources. Sensitive to changes in bottom sediments, alterations of stream, lake, river habitats, and increases in fishing pressure.
	Threatened / Endangered (T & E)
Bald Eagle *	Endangered Species. Several concentrations in Northern Idaho.
Grizzly Bear*, Gray Wolf*	Threatened Species. Need space, solitude, and easily affected by Forest activities.
Woodland Caribou *	Endangered Species. Remnant population of 20 to 30 animals that occupy IPNF occasionally (most frequently in the Selkirk Mountain range).
	Old-Growth Dependent
Pileated Woodpecker	Snag and old-growth dependent; primary excavator for cavity-nesting animals.
Goshawk	Prefers multi-layered old-growth stands for nesting. Top of food chain; predator.
Woodland Caribou *	Needs lichen growth for sustenance.
Pine Marten	Needs mature sub-alpine timber.

* These animals have occasional or historic presence in the West Moyie area.

DEAD AND DEFECTIVE TREE DEPENDENT WILDLIFE
(Primary Cavity Nesters)

In response to NFMA mandate, Region 1 guidelines recognize 40 percent of potential maximum populations as the minimum level for self-sustaining populations of primary cavity nesting species (FSM 2631.7). The policy of the IPNF is to provide at least 40 percent population level in Management Area 1 and at least 60 percent population in Management Areas 2, 3, 4, 5, 6, 7, 16, and 17. The remainder of the Forest Will be managed in its natural state (Forest Plan, Appendix X).

Within the Decision Area, Management Area 4 is currently below prescription standards because of past management activities. Reduction of cavity nesting habitat in Management Area 9 will not meet standards. All areas which do not meet Forest Plan standards will be mitigated through tree marking guidelines designating wildlife tree retention and replacement, and creating new wildlife trees (Appendix D).

MATURE/OLD-GROWTH RELATED SPECIES

This group of four species, the boreal owl, pine marten, northern goshawk, and pileated woodpecker reach their greatest numbers in old-growth forests. Analysis of population viability for the old-growth management indicator species is based on the Region 1 habitat suitability indexes (HSI's). The effects analysis for the boreal owl is based on the management recommendations of Dr. Gregory Hayward.

These species utilize different habitats during two periods of their life cycles - nesting or denning and feeding habitats. Mature to old-growth stands generally provide the best nesting or denning sites. After breeding, immature timber size classes are also utilized for feeding and dispersal of young animals.

Some stands have characteristics which provide suitable habitats for all or a combination of these species. For example, a large old-growth cedar/hemlock stand, which occurs near the ecotone with spruce fir forests, may provide quality marten habitat. Large snags are utilized for pileated woodpecker nests. Old pileated woodpecker nesting cavities may be occupied by boreal owls. Large trees provide northern goshawk nesting sites. This overlap of suitability occurs commonly and quality stands are often reflected by high HSI values for several species. Stands with high HSI values were used, in combination with other factors, for selection of recruitment old-growth stands.

The interior forest habitat contained in these areas provides the best nesting, denning and feeding habitat for old-growth associated species. Fragmentation of habitat patches through man-made and natural events can reduce an area's ability to support these species. Old-growth and recruitment stands provide nesting and denning habitat while the adjacent stands, in a mid-successional stage, provide necessary feeding habitat, travel corridors and buffer the edge effect associated with regeneration harvesting next to old-growth. The number of habitat patches greater than 80 acres and total acres of habitat patches has been selected as an indicator of the Decision Areas' condition for some interior forest habitat species. An analysis of fragmentation is located in the Biodiversity sections of Chapters 3 and 4.

Fragmentation of forested habitat occurs in the Hellroaring and Little Hellroaring drainages. Previous harvest and associated road building has reduced that area's ability to maintain old-growth associated species or allow dispersal between areas of suitable forested habitat. The fragmentation of habitat in this area is illustrated by the lack of interior habitat patches displayed on the Interior Forest Habitat Map on page 3-56. The lack of interior forest habitat is also reflected by low HSI values for the goshawk and pine marten as discussed in the following sections.

BOREAL OWL
(Ageolus funerius)

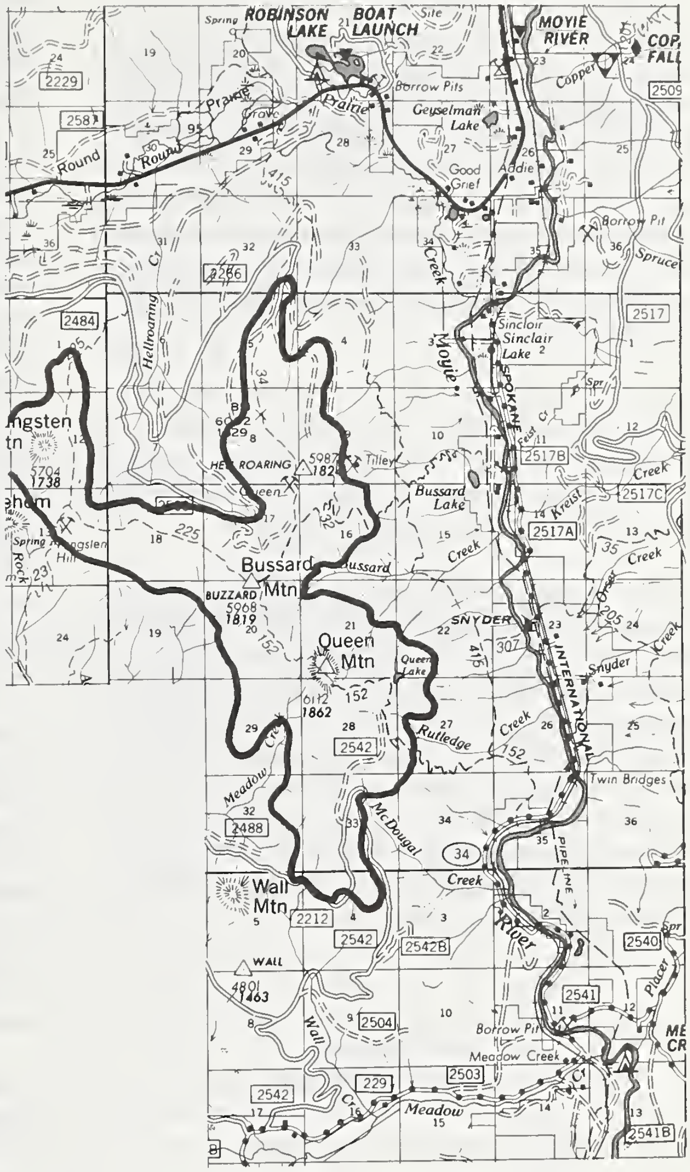
IDFG Status: Species of Special Concern
(Category A)
USFS R1 Status: Sensitive

Habitat

Boreal owls inhabit the spruce fir and upper cedar hemlock zone in North Idaho. Suitable breeding habitat exists within the Decision Area in the form of mature and old-growth spruce fir stands. Surveys (Sieracki, 1986) and nest box monitoring (Hayward, 1989a) have confirmed breeding on the Bonners Ferry Ranger District.

A March 1991 survey of the Queen Lake portion of the Decision Area solicited responses from two boreal owls, confirming their presence (Sieracki and McCammon, 1991). Boreal owls are also known to occur in Deer Creek, located five miles to the east of the Decision Area, and the Selkirk range, located approximately 15 miles west of the Decision Area.

Boreal owls nest in stands of mature to old-growth timber. These later seral stages provide prey species and have structural components suitable for nesting. Mature to old-growth stands contain snags greater than 15" diameter at breast height. Snags of this diameter and larger provide a nesting habitat for primary excavators such as the pileated woodpecker and common flicker. These species, especially the pileated woodpecker, excavate cavities large enough to be utilized by boreal owls. Mature and old-growth stands also provide habitat for the red-backed vole, which is an important prey species for the owl.



Boreal Owl Habitat Zone

Figure 3-8

Boreal owls will utilize younger stands as foraging habitat during non-breeding periods. Stands of immature sawtimber and larger timber will be considered suitable foraging habitat. Home ranges of boreal owls vary in size, but may cover from less than 2,200 acres (Reel et al., 1989) to over 5100 acres. A 5200 acre area is likely to support one or two pairs of boreal owls with overlapping home ranges (Hayward, 1989c).

Current Situation

For the purpose of the analysis, the spruce-fir vegetation type is considered to be suitable habitat for boreal owls (USDA, 1989). This habitat association is generally found at elevations above 5,000 feet in the Decision Area. Owls have been documented at lower elevations (4,400 feet) in the Selkirk Mountains. However, these birds are closely associated with Engelmann spruce and subalpine fir stands which occur at lower elevations in this mountain range.

Timber management began in the analysis area during the early 1960's. An estimate of habitat conditions which existed around 1960 (pre-logging) is displayed in Chapter 4, pages 4-108 and 4-109, for comparison to the existing condition.

Currently there is 25.1 percent potential nesting habitat in the Decision Area. The existing condition does not meet recommendations for nesting habitat. Population maintenance may depend on individuals dispersing into the Decision Area from other populations. It would take about 60 to 70 years for younger timber stands to mature enough to become suitable as owl nesting habitat. The current feeding habitat is at 56.7 percent which exceeds recommendations for foraging habitat by approximately 14 percent.

PINE MARTEN
(*Martes americana*)

IPNF status: Management Indicator Species

Habitat

Pine marten are closely associated with mature to old-growth timber stands, preferring the moist habitat types where small mammals are more abundant. Marten prefer stands with greater than 40 percent canopy closure, and avoid those with less than 30 percent (USDA Forest Service, 1989c). These canopies provide protection from aerial predators and enhance the moist conditions favorable for voles, one of the pine marten's primary prey species (NCASI, 1987).

In addition to a closed canopy, marten require an abundance of large, fallen logs and snags. This provides secure resting places, denning habitat and winter access to small mammals living beneath the snow (USDA Forest Service, 1989c)

Security habitat is also very important to pine marten. They are highly susceptible to overharvest in areas accessible by fur trappers. In northern Montana, trapping typically harvests 35 to 40 percent of the pine marten population (Hash, 1989c).

Pine marten are present in the Decision Area, primarily above 3500 feet elevation, and to a lesser degree at lower elevations. Tracks were documented near Queen Lake in March of 1988 (Sieracki, 1989d), and evidence of marten trapping was reported along the Sidehill Trail on the eastern side of the Decision Area (Grant, 1989).

Current Situation

Analysis of the existing conditions within the Decision Area showed that six of the eight analysis units have sufficient food and cover habitat to support pine martens. During initial phases of analysis it was determined that the original unit number seven was too small to stand alone. It was combined with analysis unit number five. All maps and tables refer to units one through six, eight and nine. The pine marten analysis unit map is included on Page 4-119.

Analysis units number one and two in the Hellroaring drainage contain adequate feeding habitat. But they do not meet the standard cover minimum requirements of 250 acres. The inadequate cover habitat is a direct result of the Hellroaring timber sale scheduled to be completed in 1991. The extensive regeneration harvesting and high road densities have greatly reduced the availability of suitable pine marten habitat in these areas. The table below includes a column for modified cover habitat HSI. This modification includes road density calculations and is based on the most current HSI model.

Suitable travel corridors are present along the western, eastern and southern boundaries. They provide an opportunity for pine marten to disperse

into and out of the Decision Area, increasing the genetic diversity of the local marten population. The northern corridor to the Robinson Lake area has been reduced in effectiveness due to past management activities and development on private lands (see page 3-55 Biological Corridors). Although the two northern marten analysis units are unsuitable, the remaining six units retain suitable marten habitat over 77 percent of the Decision Area.

In its current state, the Decision Area provides suitable marten habitat to maintain a healthy local population. The Decision Area by itself is incapable of supporting a fully self-sustaining pine marten population (based on a minimum need of 500 individuals). However, large areas of mature and old-growth timber exist adjacent to the western boundary of the Decision Area. It is probable that these areas provide additional habitat for the local pine marten. The viability of the local population can only be maintained if suitable pine marten habitat remains evenly distributed throughout this larger area.

TABLE 3-3
Pine Marten Existing Habitat Quality and Acreages

		Feeding Habitat <------------>		Cover Habitat <------------------->		
Analysis Unit	**Total Acres**	**HSI Index**	**Standard Acres**	**HSI Index**	***Modified HSI Index**	**Standard Acres**
1	2200	64	972	59	12	203
2	1731	61	930	55	11	169
3	2233	61	1118	62	43	760
4	1958	57	775	70	49	672
5 #	2401	60	1330	63	63	1477
6	1880	66	924	66	46	638
8	2743	64	1112	59	41	749
9	1651	65	898	71	71	986

* Modification includes road density calculations and is based on the most current HSI model.
# Analysis unit 7 was combined with unit 5 for analysis purposes. The original unit 7 was too small for adequate analysis.

NORTHERN GOSHAWK
(*Accipiter gentilis*)

Habitat

Goshawks occupy mature and old-growth coniferous forests with specific structural characteristics. Within their home range they usually nest in the oldest stand with a high canopy cover and high basal area (Hayward, 1983). Nesting stands of 125 acres or larger are preferred. Goshawks prefer nest trees of large diameter (20" dbh or greater) located on the gentle slopes of the bottom one-third of the hillside.

Goshawks generally build nests on a northern aspect throughout northern Idaho and Montana. However, four of the eight known nests on the Bonners Ferry Ranger District are located on southerly aspects. Often nests are associated with forest openings greater than three acres, but it is not known if this is by actual nest site selection (Hayward 1983). Goshawks frequently move their nests, and alternative nests are found within 100 m. of the original. A pair of goshawks require at least 5000 continuous acres of suitable habitat for nesting and breeding (Hayward, 1983).

Goshawks use a variety of stand structures for foraging and have been observed hunting in small openings and along the forested edge of large openings. Natural openings and corridors within the stand are used as flight paths and for foraging (Olsen, 1989). The "ground-shrub zone" (area from the ground to the top of shrubs) and "shrub-canopy zone" (from the shrubs to the tree tops) provide a variety of prey species (Hayward, 1983).

Goshawks prefer avian prey, but will forage for rodents and snowshoe hare, particularly during the winter season. In locations where there is an abundance of small mammals, goshawks are known to "invade" the area. Down woody material is an important factor to maintain small mammal populations upon which the goshawks prey, and large snags are used to perch and consume prey (Olsen, 1989).

Goshawks are sensitive to human disturbance during nesting season and will invariably abandon the nest (Hayward, 1983). Any logging activity near the nest will cause the pair to leave the nest at that time or during the next nesting season (Olsen, 1989). In one area of the Bonners Ferry Ranger District harvesting took place in a stand adjacent to a nesting stand. After building an alternate nest the pair abandoned the territory. It could not be confirmed if the bird left in direct response to the logging activity. In some cases where human disturbance is constant but slight, goshawks may adjust to that disturbance (Hayward, 1983).

Goshawks are presumed to be present in the Decision Area. A May 1989 survey conducted by the Bonners Ferry Ranger District recorded no nests or sightings. This cannot be considered conclusive since goshawks do not always respond to the technique used in the survey (Kilpatrick, 1989b). There is suitable goshawk nesting habitat within and surrounding the Decision Area, and an abundance of prey species such as ruffed grouse and snowshoe hare is available.

Current Condition

Nesting habitat is the most limiting factor to reproductive success of goshawks (Austin, 1989). An analysis of existing conditions showed that suitable nesting stands are present to support a breeding pair of goshawks in each of the three old-growth management units.

Four analysis units have been identified; one in Old-Growth Management Unit 23, (OGMU 23), two in OGMU 25, and one in OGMU 30. Only the portion of the OGM units which is within the Decision Area have been analyzed. Analysis unit 1 is the segment of OGMU 23 which falls within the Decision Area. Analysis unit 2 is the north half of OGMU 25, analysis unit 3 is in the south half of OGMU 25. Analysis unit 4 is in OGM unit 30, most of the land base associated with OGMU 30 is outside the Decision Area. There is not sufficient acreage within the Decision Area to provide goshawk habitat in this OGM unit. See Goshawk Analysis Units and Nesting Areas Map, figure 3-9.

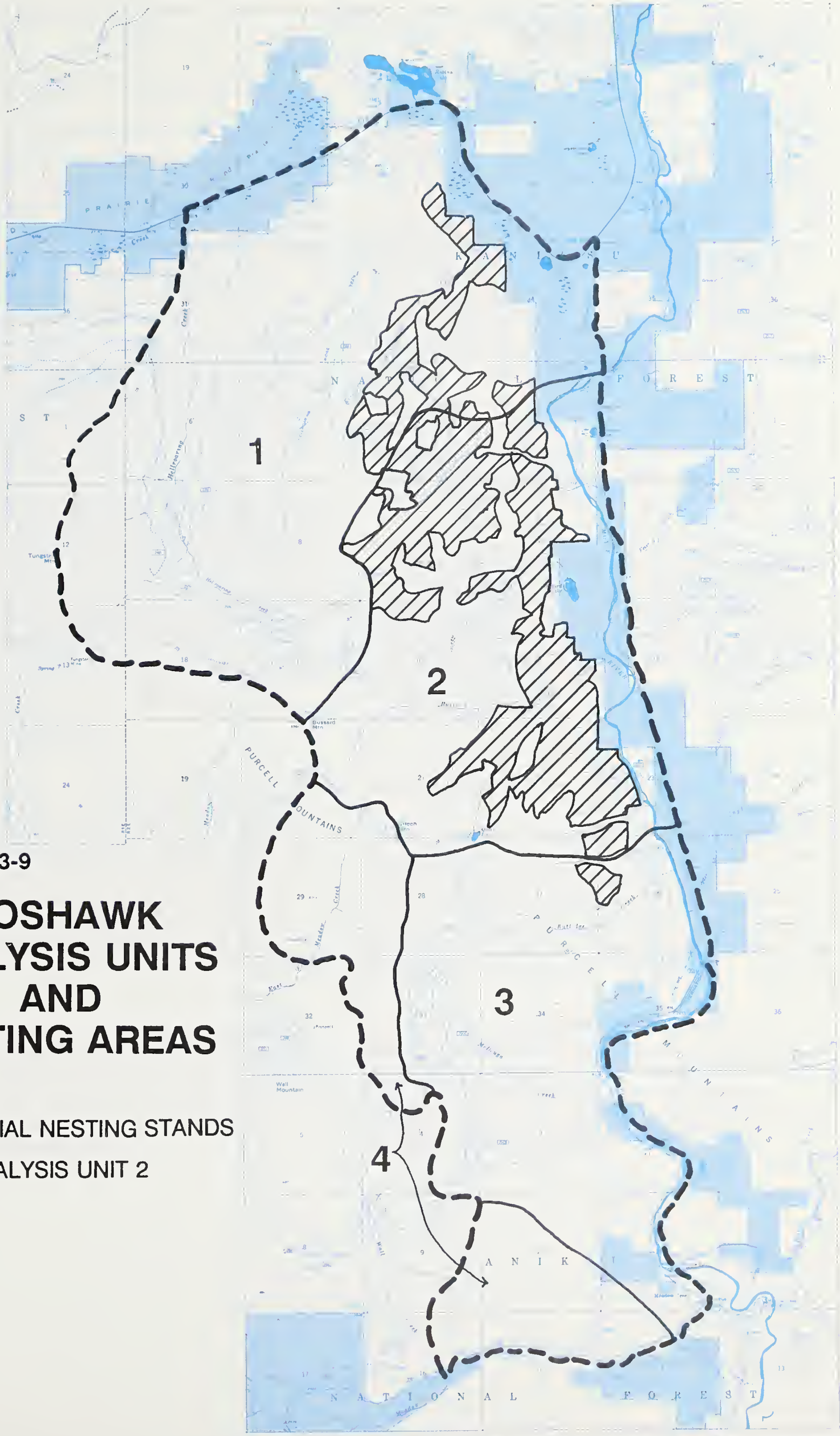


Figure 3-9

GOSHAWK ANALYSIS UNITS AND NESTING AREAS

POTENTIAL NESTING STANDS FOR ANALYSIS UNIT 2

Analysis unit one is most of the portion of OGMU 23 that is south of Round Prairie Creek. This portion of the OGMU is separated from the portion north of Round Prairie Creek by one mile of meadow and wetlands that is privately owned and developed for agriculture and residences. The Hellroaring timber sales fragmented and reduced feeding habitat below the threshold necessary to provide habitat for a pair of nesting goshawks, therefore this unit is unsuitable for goshawks.

Analysis unit three has a Feeding Habitat Suitability Index below the minimum required level. This unit does not provide enough feeding habitat to support a nesting pair of goshawks due to the predominance of pure lodgepole pine stands and immature timber classes.

Analysis unit two has a feeding index above the minimum level for suitable feeding habitat and would support a nesting pair of goshawks. This analysis unit provides a good distribution of high value feeding stands. Large blocks of suitable nesting habitat are available for nesting goshawks within and adjacent to this analysis unit. There is private ownership adjacent to many of the potential nesting stands along the east side of the analysis unit. However, topographic breaks at the bottom of the unit serve as a barrier to activities on the private land. The single most valuable nesting stand is that stand due west of Bussard Lake. While this stand is close to private land, the topographic break in conjunction with the lake and surrounding wet lands make it unlikely that activities on this private land could be of the magnitude that would disturb nesting goshawks (see figure 3-9).

Analysis unit four is that portion of OGMU 30 that is within the Decision Area. Unit 4 is not of sufficient size to provide goshawk habitat. However, there is sufficient acreage within the remainder of the OGMU to provide sufficient habitat. There are large blocks of old-growth and mature timber in this OGMU, making it likely that suitable habitat does exist.

BIG GAME HABITAT

ELK
(*Cervus canadensis*)
IPNF: Management Indicator Species

Habitat

Elk have been selected as a Management Indicator Species (MIS) on the Idaho Panhandle National Forest; they are one of the main issues identified through public involvement during development of the Forest Plan (Forest Plan Appendix L., p.4). The Forest Plan directed emphasis on elk management towards the southern half of the Forest. They have been selected as MIS for big game summer range in the Decision Area because of interest expressed by the public and elk's sensitivity to human activity.

Elk are common inhabitats of the Decision Area. The Queen Mountain area is a popular place to hunt elk in Boundary County. Local residents have expressed an interest for increasing big game numbers in order to provide more hunting and viewing opportunities.

The West Moyie provides year-round habitat for elk. Elk are a product of their year-round environment, and it is difficult to say that any one season is more important than others for their well being and survival (Leege, 1984). The management areas which provide summer range on the Decision Area are MA 1 (lands designated for timber production) and MA 9 (lands unsuitable for timber production or with isolated pockets of suitable land).

Roads have a significant influence on the density of elk and the level of hunter success. Despite the fact that elk densities adjacent to open roads are reduced, the harvest rate on elk remaining is much higher because of increased hunter densities (Hershey and Leege, 1976).

Results from a study in central Idaho (Zager, 1989) on the effects of road access on bull elk ability to escape hunting pressure show the importance of access management. Significant increases in hunter access will reduce the bull:cow ratio. Unroaded areas in central Idaho had a bull:cow ratio of 45:100; while the roaded portion had a lower ratio of nine bulls to 100 cows. In general a bull:cow ratio below 5:100 will cause problems with the herd. Idaho Fish and Game has expressed concerns that additional access may increase the harvest and thus eventually affect hunting seasons (Idaho DF&G, 1989).

Generally, forage is not considered limiting on summer range. Cover is not considered limiting on summer range until it begins to drop below the 40 percent level. White-tailed deer have been selected as the indicator species for big game winter range. It is assumed that if the winter range requirements of white-tailed deer are met, they will also provide for elk.

Current Situation

The area selected for analysis is located above winter range as delineated in Alternative I to the ridgeline. It encompasses approximately 15,000 acres. Due to the relatively large size of the analysis area, even a small (1 percent) change in elk habitat effectiveness represents a significant change in potential.

Currently elk habitat effectiveness is at 56 percent. In general, Idaho Fish and Game recommends maintaining at least 50 percent elk habitat effectiveness. The IPNF Forest Plan did not assign elk management targets to the management allocations in the West Moyie area.

WHITE-TAILED DEER
(Odocoileus virginianus)

IPNF: Management Indicator Species

Habitat

White-tailed deer are common inhabitants of the Decision Area. They winter along the Moyie River, Round Prairie Creek, and Sinclair Lake and occur throughout the Decision Area as the season progresses through spring, summer and fall.

The Decision Area is a popular place to hunt. Residents have expressed a desire to have an increased number of both deer and elk in the valley to improve recreational hunting opportunities of these animals.

Current Situation

Field reconnaissance has indicated that Pachistima and westen redcedar are the most common browse species. These understory species occur beneath stands of immature sawtimber and appear to be heavily hedged.

Most of the quality winter range along the Moyie River is in private ownership, and is generally forested. Only a small percent of National Forest land is adjacent to the Moyie River. National Forest ownership of winter range begins at the bottom of the Decision area, and extends uphill to the 3,000 foot level. In the winter, deer are usually located at lower elevations in association with river bottoms and lake shores (Jageman, 1984).

During years of heavy snow, snow depth precludes the use of large natural openings and clearcuts by whitetails (Jageman, 1984; Pauli, 1989). During the coldest months and deep snow conditions, deer appear to select habitats for the cover value and eat whatever is available in these habitats (Jageman, 1984).

Snow interception in stands along the Moyie River were measured in February of 1990. Seven snow depth measurements taken under the forest canopy had a mean of 11.5". Four snow depths taken in an adjacent meadow had a mean of 30.6". Deer sign was common in these stands. Deer were browsing on cedar, which occurred in the understory, and were bedding near the Moyie River. Deer beds and some limited foraging were noted close to the 3,000 foot level, at the upper limits of the winter range analysis area (Christensen and Sieracki, 1990).

Current distribution of regeneration units to forested cover is poor. There has been extensive harvesting along Highway 95 at the north end of the Decision Area. This harvesting was initiated to capture mortality caused by severe ice storm damage in the area, and consists of 20 to 60 acre regeneration units. The existing cover/opening ratio is 71/29.

The area designated as winter range (MA 4) covers a minor percentage of the area which is utilized by deer. See the winter range map on the following page.

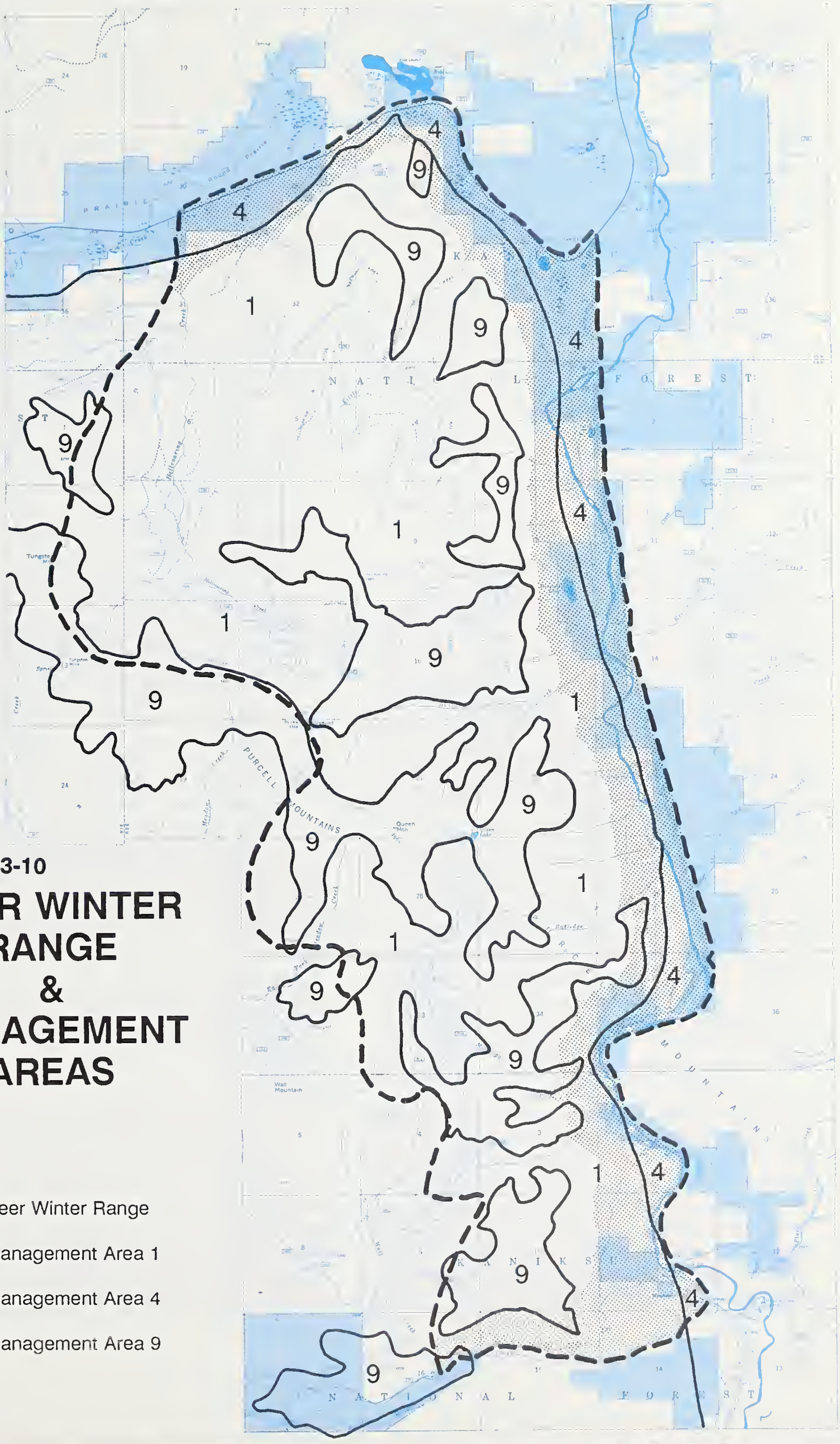


Figure 3-10

DEER WINTER RANGE & MANAGEMENT AREAS

Deer Winter Range

1 Management Area 1

4 Management Area 4

9 Management Area 9

INTRODUCTION

This chapter opens with a discussion of the ecosystem and biodiversity within the West Moyie decision area. Various elements of biodiversity are introduced including vegetative diversity, habitat types, and forest succession. Changes in forest succession because of natural and human events are explained, including a discussion on edge effect. The importance of special environments such as old-growth forest, riparian areas, and unique areas are then outlined. Important species in assessing biodiversity, both sensitive plant species and wildlife management indicator species, also are discussed.

THE ECOSYSTEM

The West Moyie Decision Area can be described as a collection of distinct ecosystems, together forming an ecological mosaic. Several vegetative types are present within the ecosystem along with a diversity of other lifeforms, resulting from the changing conditions within the Decision Area. As a natural system, the ecosystem does not function in isolation but instead is interconnected on many levels from microsite to forest stand to the surrounding landscape. The ecosystems within the West Moyie area interact among themselves as well as with neighboring ecosystems.

Biological diversity is the distribution and abundance of different plant and animal communities and species within a specific geographic area. The biological diversity represented in the West Moyie area includes hundreds of plant and animal species, and an unknown but immense number of invertebrate animals, fungi, and bacteria. All of these species are interconnected in many different biological communities and through a myriad of pathways, processes, and cycles.

Biological diversity is a global issue with profound implications in managing natural resources on National Forest lands. At the root of this issue are public concerns about the accelerating losses of species due to the cumulative impacts of human activities. While past as well as current rates of species extinctions are difficult to determine, biologists generally agree that we are currently experiencing losses of diversity that are without precedent in human history. They also agree that these losses are a significant problem relating to human welfare. Increasingly, land managers are being asked to assess the impacts of their management practices on biological diversity.

Obviously, it is not possible to address every aspect of this complexity. Therefore, we need to identify specific aspects of biological diversity, such as distinct species and habitats, biological communities, or ecological processes that will ensure the health of the entire ecosystem. A number of these important elements are discussed in the following analysis of the West Moyie area.

Vegetative Diversity

Vegetation in the West Moyie Decision area is generally typical of north Idaho. The primary influence on vegetation through this region is the weather system of prevailing westerly winds which carry maritime air masses from the northern Pacific Ocean across the Northern Rocky Mountains. This general weather pattern has produced the type of climate necessary for survival of coastal species in the Inland Northwest (Cooper et. al., 1987).

Mixed conifer tree species overtopping a diverse flora of understory vegetation characterizes the Decision Area. With the exception of some large stands of nearly pure lodgepole pine, timber stands here have a rich diversity of tree species--a common characteristic of north Idaho forests. Commercially important conifer tree species include ponderosa pine, western white pine, western larch, western red cedar, Douglas-fir, lodgepole pine, western hemlock, Engelmann spruce, grand fir, and subalpine fir.

The understory tree canopy is generally dominated by climax or other shade-tolerant species such as cedar, hemlock, grand fir and subalpine fir, depending on habitat type. Because of the young seral stage of these stands, the hardwood seral species quaking aspen and paper birch are also found. In particular, some of the less dense stands on the slopes above the Moyie River contain quaking aspen and paper birch.

As shown in Table 3-4, the majority of the stands in the Decision Area have been inventoried. The Bonners Ferry District has a continuing program of stand examinations to assess stand conditions. Data including species composition, habitat type information, tree age and size, insect and disease data, and other stand and site information is collected. In addition, various specialists have visited portions of the West Moyie area to examine vegetation, wildlife, watershed, old-growth, and other resources through the planning phase of the West Moyie project.

Habitat Types

The vegetative diversity within the West Moyie Decision Area can be described using habitat types, a system of vegetation classification. Habitat types are considered the basic subdivisions of landscapes in north Idaho (Daubenmire and Daubenmire, 1968). Daubenmire defined habitat types as all those land areas capable of supporting similar plant communities at climax. Important factors influencing the climax vegetation type include general climactic conditions, soil variations, and topographic features.

Daubenmire's work also showed that vegetation communities in northern Idaho and eastern Washington respond to relative abundance of moisture. Specific tree species and plant communities can be expected at designated elevations or on certain aspects due to the soil/moisture relationships. Therefore, habitat type designations can serve as a good predictor of a site's productive potential (Alexander, 1985).

Habitat types are logically named for the climax tree and understory vegetation that would eventually occupy an area. The classification's series level identifies the potential climax tree species, usually the most shade-tolerant tree adapted to the site. Few areas ever reach a climax stage of vegetation, however, because of changing conditions resulting from natural forest fires or other events. Table 3-4 shows the relative acreage of the various habitat series in this analysis area.

The majority of area within the Decision Area is composed of the western hemlock and cedar habitat series; these series are the most productive on the Idaho Panhandle National Forests largely because of their more moist conditions and longer growing season. The Douglas-fir and grand fir habitats have more dry site conditions. The subalpine series is a higher elevation habitat.

TABLE 3-4

Summary of Area by Habitat Series

Habitat Series	Acres	% of Area Surveyed
Douglas-fir	1832	10.0
grand fir	350	1.9
cedar	3911	21.3
western hemlock	8479	46.3
subalpine fir	3769	20.5
Unsurveyed Land	4063	N/A

Within each broad habitat series, several habitat types occur. This second classification refers to a dominant or indicator climax undergrowth species of the plant association. For instance, within the Douglas-fir habitat series in the West Moyie Decision area, the ninebark (PHMA), snowberry (SYAL), and white spirea (SPBE) habitat types are represented. The snowberry habitat type typifies a more dry environment than the ninebark type; therefore, the plants associated with the snowberry habitat type are different. Ninebark will not be present in the snowberry habitat type because it is not adapted to the more dry site conditions. The other habitat series also include a variety of habitat types and corresponding plant associations. Therefore, the West Moyie area can be characterized as a patchwork of different plant communities dependent on varying site conditions. Subalpine fir habitat types and associated understory species occupy the higher elevations. Douglas-fir and grand fir habitat types, grow in the drier, lower elevations. Western hemlock and cedar habitat types, are found in the more moist, lower elevations.

A complete description of habitat types and associated plant communities is outlined in the publication, *Forest Habitat Types of Northern Idaho: A Second Approximation. The Field Guide to Forest Plants of Northern Idaho* lists forest plants associat-

ed with a variety of habitat types. A review of the field stand exam data shows the majority of the stands have most of the species represented for a given habitat type.

As with plants, other organisms also are adapted to the different site conditions as represented by habitat types. There will be a richer diversity and different mix of species of various invertebrates, soil organisms and microbes, and fungi in a western cedar or western hemlock habitat series than a Douglas-fir habitat because of the more moist site conditions represented in the cedar/hemlock habitat type.

Likewise, the distribution of animal species may be influenced by the site conditions or plant associations typical of a particular habitat type. Some species are specifically adapted to a particular habitat type. As an example, the white-winged crossbill, a member of the finch family, typically feeds on seeds and cones of Engelmann spruce, a primary seral species in a subalpine fir habitat type. Other species such as black bear and the American robin, which are not so specifically adapted, may occur throughout the range of habitat types in West Moyie.

Habitat types are used as a tool in forest management. The main advantage of habitat types in forest management and in evaluating biodiversity is that they provide a permanent and ecologically-based system of land stratification. Each habitat type encompasses a certain amount of environmental variation, but the variation within a habitat type should be less than between types. In addition, habitat types provide a classification of climax plant communities.

Plant succession, which is discussed in the subsequent section, should be generally predictable for each habitat type. Similar responses to management treatments and silvicultural systems can be expected on units of land within the same type (Pfister et.al., 1977). A wide range of silvicultural systems commonly can be successfully applied to these habitat types including shelterwood, seed tree, clearcut, and selection harvests. Intermediate silvicultural systems such as commercial thinning, sanitation and salvage are also suitable.

Forest Succession

The vegetation for a particular habitat type can be classified according to a distinct sequence called forest succession. Depending on a site's habitat type, plant species will vary for a particular successional stage. Stages can be characterized as early-successional, mid-successional, and late-successional. Older, more climax vegetation will typify a late-successional stage. For example, in a late-successional western hemlock/wild ginger habitat type, western hemlock would overtop the understory vegetation in which wild ginger would commonly occur (Cooper, et.al., 1987). Conversely, western hemlock and wild ginger may exist only as scattered individuals in an early-successional stage; seral species would dominate the site. Few areas ever achieve a climax forest condition because of these natural and human-caused changes (Alexander, 1985).

The hierarchy of habitat series and types and successional stages can be shown as layers building upon each other and becoming more specific from bottom to top.

Successional Stages
Early,
Mid, or
Late

Habitat Type

Habitat Series

Various species of animals, invertebrates, soil organisms and microbes are also dependent on a particular stage of succession. A full range of combinations of successional stages is important to maintain a broadly diverse and healthy ecosystem. The successional stage and plant association combinations represented by smaller areas are particularly important to biological diversity, as these areas provide narrow ecological niches for certain species.



Grass-Forb-Shrub	Open Pole/Sapling	Close Pole/Sapling
Soil Lichen	Soil Lichen	
Orange Cup Fungi	Orange Cup Fungi	
Fireweed	Fireweed	Canada Mayflower
Pearly Everlasting	Pearly Everlasting	Depauperate Understory (sparse forb layer)
Bracken Fern	Bracken Fern	
Redstem Ceanothus	Redstem Ceanothus	
White-crowned Sparrow	Orange-crowned Warbler	Black-capped Chickadee
Northern Flicker	Northern Flicker	Downy Woodpecker
Red-tailed Hawk		Sharp-Shinned Hawk
Short-eared Owl		Saw-whet Owl
Deer Mouse	Meadow Vole	
White-tailed Deer	White-tailed Deer	White-tailed Deer
Elk	Elk	Elk


Mature or Large Sawtimber	Old Growth
Old Man's Beard	Old Man's Beard
Indian Paint Fungi	Indian Paint Fungi
Pinedrops	Pinedrops
Wintergreens	Wintergreens
Sword Ferns	Sword Ferns
Grape Ferns	Grape Ferns
Pacifc Yew	Pacific Yew
Townsends Warbler	Townsends Warbler
Hairy Woodpecker	Pileated and Black-backed Woodpecker
Cooper's Hawk	Northern Goshawk
Barred Owl	Boreal Owl
Red-backed Vole	Red-backed Vole
White-tailed Deer	White-tailed Deer
Elk	Elk

Figure 3-11 shows representative species associated with various successional stages.

Changes In Forest Succession

Changing site conditions as a result of natural or human-caused events alters the ecosystem. Wildfire especially has played a major role in affecting vegetative change and forest succession. There is steadily growing recognition of the importance of natural (lightning-caused) fires for the perpetuation of natural forest ecosystems and landscape diversity in the Northern Rocky Mountains (Cooper, et.al., 1987).

For example, various tree species have adapted to a fire environment. The thick bark of older larch, Douglas-fir, and ponderosa pine trees in the northern Rocky Mountains is an example of a fire-resistant adaptation by these species to their environment. Lodgepole pine owes its widespread occurrence to past fire. Although the thin-barked lodgepole pine is more susceptible to being killed by fire than a larch, this pine has a closed cone habit (i.e. serotinous cones) that enables lodgepole to regenerate large areas after a fire (Lotan, et.al., 1985).

Without fire, Douglas-fir would dominate those areas classified as a Douglas-fir habitat where it is the climax species. However, ponderosa pine often is the major species because of a fire environment which allows it to out-compete the Douglas-fir. Similarly, periodic fire allows western larch and western white pine to persist on many sites because the bare ground following fire allows these species to regenerate more easily. In a like manner, fire also favors Engelmann spruce at the expense of subalpine fir in a subalpine fir habitat (Fischer and Bradley, 1987 and Wellner, 1970).

Other species also are dependent on fire. Various plant species including ceanothus and aspen are dependent on fire to regenerate (Wright and Bailey, 1982). Fields of thin-leaved huckleberry largely have originated from wildfires. Ecologically, these fields are seral--temporary stages in natural succession from treeless burn to climax forest. Without fire or other radical disturbance, huckleberries gradually are crowded out by invading trees or brush (Noste and Bushey, 1987).

A change in vegetation affects other species. For instance, the increase in huckleberry populations creates a larger available food supply for animals such as the black bear and mountain bluebird. The shrub fields resulting from a fire or other disturbance provide nesting habitat for orange-crowned warblers, white-crowned sparrows, and lazuli buntings and optimal habitat conditions for some mammals such as the deermouse. These animals would not be as numerous if the forest reached a climax stage of succession.

Our study of the West Moyie area and its history, ecology, and plant associations reveals that it is dominated by a mid-successional, or seral, vegetation stage. Virtually the entire area of West Moyie has some indication of past fire occurrence: even-aged stand structure of seral species, charred material on the ground, burned-out stumps and snags, and fire-scarred bark. Nearly all of the stands in this area were established following large forest fires of the late 1800s and early 1900s. Seral species including larch, Douglas-fir, lodgepole pine, white pine and spruce generally dominate the overstory of most stands. Because these turn-of-the-century fires largely burned the majority of trees on a site, the overstory basically consists of trees of approximately the same age (i.e. even-age) of 100 years.

However, the fires did not burn completely over the area. Aerial photographs taken in the 1930s record a mosaic of conditions. Individual older trees or pockets of trees that were not consumed in the fire are scattered through the landscape. Moister areas along creeks and on more northerly slopes did not burn as hot as south-facing slopes so more trees and other vegetation survived in these locations. Individual trees of some species including larch, Douglas-fir, and ponderosa pine survived the fires because of their better adaptability to a fire environment. Other species such as cedar, grand fir, and subalpine fir were killed by the fire because they did not have the thick bark and higher branching pattern of larch, Douglas-fir, and ponderosa pine. Several of the isolated patches which escaped the turn-of-the-century fires have been identified as old-growth forests. These areas are discussed in a late section of this chapter.

As stated above, there is very little diversity of stand structure due to the fire history of the West Moyie Decision Area. The common situation is a fairly dense canopy of sawtimber-sized trees

ranging in diameter at breast height (DBH) between seven to eighteen inches. Below the highest canopy level, the intermediate crown canopy contains a few poletimber or small sawtimber-sized trees ranging between four and nine inches DBH. In the suppressed canopy level (i.e. understory), trees are either seedlings or saplings less than two inches in diameter. Stands of this structure exhibit a very strong even-aged character. Viewed horizontally through the stand, the appearance is normally a single-storied or two-storied canopy.

Since the turn-of-the-century fires, natural disturbances have had less impact on vegetation in the West Moyie area. Lightning fires spread by wind have created small, isolated openings which have been subsequently re-occupied by the seeding or sprouting of surrounding vegetation. Insects and disease attacks on individual trees have caused the same effect of creating small openings. As discussed later in this chapter, white pine blister rust, a fungus not native to the United States, has caused considerable mortality among western white pine trees.

The death of an individual or a group of white pine trees opens the canopy enough to allow suppressed trees and other understory vegetation to release and to flourish. This is most beneficial to those species which are better adapted to more open, sunny conditions. This mortality in timber stands with a larger component of western white pine causes the appearance of these stands to be multi-storied, though they are essentially even-aged, and changes the site conditions for a variety of plant and animal species. Other insects and diseases, most importantly mountain pine beetle and root disease, have caused similar effects.

Human actions such as logging and land-clearing also cause changes in successional stage. Logging has been the main element of change over the past 25 years in the West Moyie area. Similar to a forest fire, even-aged harvest treatments including clearcut, seedtree, and shelterwood silvicultural systems revert a stand from a mid- or late-successional stage to an early-successional stage. Harvesting will favor the invasion of pioneer and seral species, particularly if mineral soil is exposed by the logging operation (Spurr and Barnes, 1980). On these acres, the stands range in size from seedlings on the most recently harvested units to saplings/small poletimber on some of the older cuts. Two-storied stands, with seedling/sapling trees overtopped by scattered 12 to 18 inch mature sawtimber trees, exist on those areas being regenerated by the seed tree and shelterwood systems. The map of Previously Harvested Areas depicts the timber harvest units in the West Moyie area.

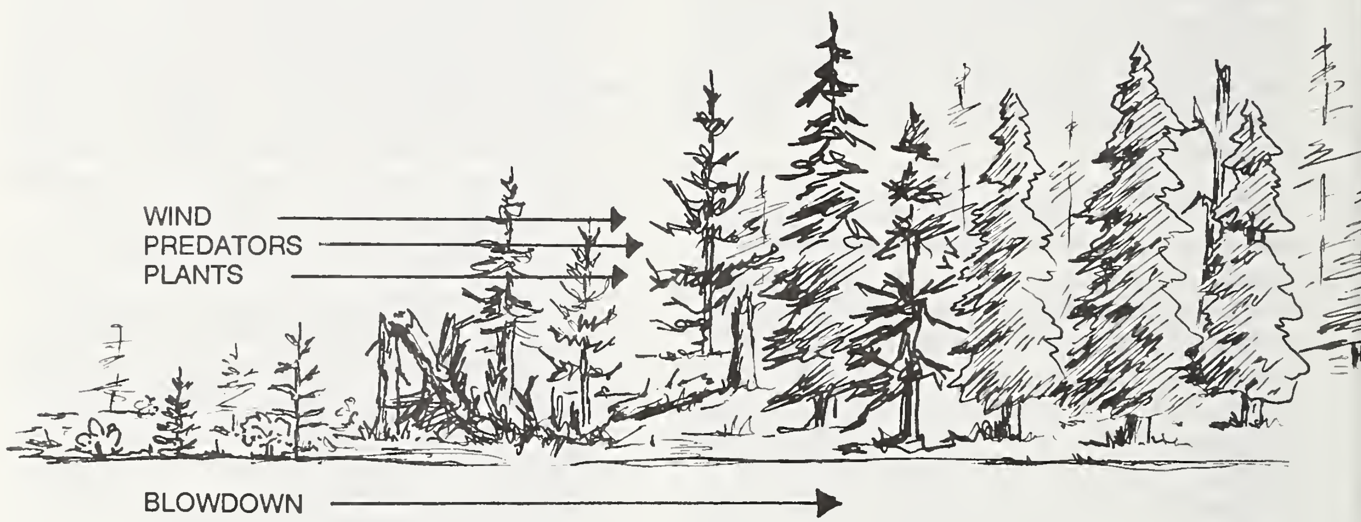
Another element of change is climate. The evidence from the fluctuations of lakes, from tree rings, and from other sources point to the fact that the period from 0-1000 A.D. was relatively warm, but that a period of increasing cold set in about 1300, ending about 1800 (Spurr and Barnes, 1980). During this latter period, mesophytic trees (i.e. plants adapted to grow under medium conditions of moisture) and other plant species in many parts of the world invaded sites occupied by other plant species better suited to drier and warmer climates.

Over the past 100 years, a general warming of the climate has occurred. Records indicate that the climate has warmed approximately 1.5 degrees Fahrenheit over the past century (Rosenzweig, 1919). Some studies predict the atmospheric temperature to increase by three to five degrees Centigrade in the next 100 years (Joyce, et.al., 1990). This recent phenomenon, called global warming, would favor those plant species which are more adapted to drier and warmer environments. Whether this recent but short trend will prevail in the future cannot, at present, be predicted. It is clear, though, that our climate is unstable. Changes are to be expected both in future climates and in the forests as a result of the response of various species to changed environmental conditions (Spurr and Barnes, 1980).

Edge Effect

Edge effect is the result of changes in microclimate and species composition which are caused by an increased exposure to sun and wind. Events such as logging, land-clearing, and fire that create openings will cause edge effect to occur on the adjacent stand. Blowdown of trees along the margins of the openings occurs because of higher wind velocities, and causes a more open environment. Edge effect penetrates a forest edge for approximately two tree lengths, or 200 feet in the northern Rocky Mountains. However; topography, aspect, slope, and height of neighboring vegetation may increase or decrease the distance.

The greatest effect with the most increase in sunlight and wind is immediately adjacent to the opening, and diminishes as the distance increases. Edge effect is occurring adjacent to the existing natural openings and harvest units in the West Moyie area and along cleared land on the boundary of private land along the margins of the Decision Area.



This drawing illustrates edge effect
FIGURE 3-12

Pioneer and early-successional plant species invade the edge, altering the species composition and making this zone an ecotone between an opening and the remainder of the forest stand unaffected by increased sun and wind. Mycorrhizae and other fungi, invertebrates, soil organisms, and other lifeforms are affected by the more open conditions. species adapted to a more open environment may benefit from edge effect, while those species dependent on a closed canopy of tree cover may be at a competitive disadvantage. Mycotrophic plants (those that require a mycorrhizal fungai connected with a green plant for food) such as indian pipe and pine drops have been observed to recede from the edges of logged or burned areas (McGee, 1990). Animals are similarly affected.

Old-growth

Forests in, or approaching, a climax stage are termed "old-growth." These forests play an important role in maintaining biological diversity. Old-growth forests have a unique structure and composition that provides critical habitat for a wide range of associated plant and animal species as well as a variety of other biota (Habitat Features, 1989). Old-growth forests also have other intrinsic social and recreational values.

There are many species of wildlife associated with old-growth forests. On the Idaho Panhandle National Forests, forty vertebrate wildlife species have been identified which depend on old-growth forests for optimal habitat (Jerry, 1983). These species are listed in Figure 3-11. All of these species may also be found in forests that are mature and have not fully developed into old-growth ecosystems. However, these old-growth associated wildlife species are found in greater abundance in old-growth forests than in younger forests because old-growth ecosystems provide the most optimal conditions for the species survival. Other organisms also are dependent on old-growth forests. For instance, late-successional plant species such as Pacific yew and saprophytic species including Indian-pipe (*Monotropa uniflora*) and pinedrops (*Pterospora andromedea*) are more commonly found in an old-growth environment.

Old-growth forests usually are identified by a number of structural features including:

- presence of large trees,
- variations in tree sizes and spacing,
- accumulations of large-sized dead and fallen trees,
- decadence in the form of broken or deformed tops and diseases,
- multiple canopy layers, and canopy gaps,
- and understory which is patchy.

Not all of these features may be present in an old-growth stand of a given forest type. For example, multiple canopy layers and large accumulations of dead wood may be lacking in fire-dependent pine types. However, most old-growth will possess several of the above characteristics and also include other structural features (IPNF Old Growth Inventory Procedures (Draft), 1990).

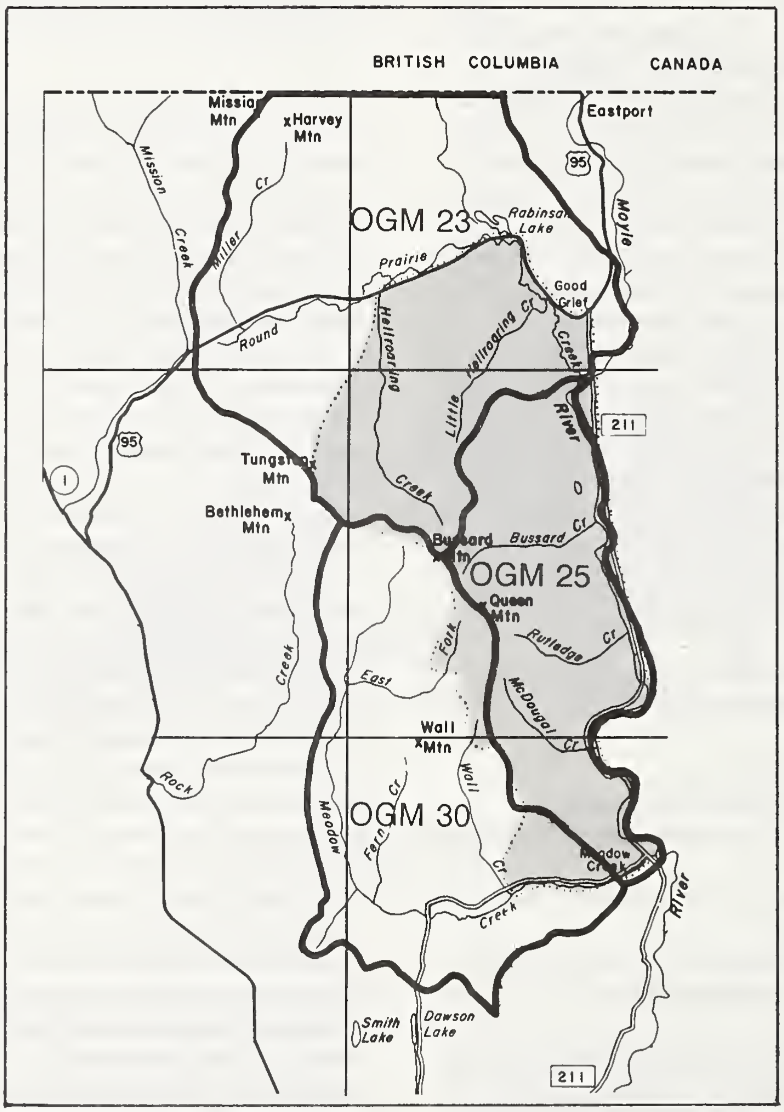
A definition of old-growth encompassing the majority of the habitat types found on the Idaho Panhandle National Forests is currently being finalized. To develop this definition, a detailed vegetative inventory of identified old-growth communities has been initiated. Analysis of this data as well as information from plots taken for grizzly bear habitat mapping will refine the description of old-growth communities.

The Forest Plan objectives for old-growth management are to maintain approximately ten percent of the Idaho Panhandle National Forests in old-growth and to reserve a minimum of five percent of each old-growth management unit as old growth where it exists. The size of an old-growth management unit is approximately 10,000 acres. Maintaining a spatial distribution of old-growth stands by old-growth management unit and a distribution proportional to the occurrence of habitat type groups will help maintain viable populations of species which prefer an old-growth environment.

Portions of three old-growth management units are included in the West Moyie Decision Area as shown on map Figure 3-13. The old-growth in these management areas was mapped using vegetative stand exam data and aerial photo interpretation. The mapping was later ground-verified by an individual familiar with local plant communities. Lower elevation cedar/hemlock, high elevation spruce/subalpine fir, and low elevation dry ponderosa pine plant communities are represented. Potential old-growth stands in the Decision Area are also displayed in Figure 3-14, OGMU Map. These stands are approaching old-growth but may lack the distinct characteristics of old-growth as listed below. The Idaho Panhandle National Forest presently is finalizing their inventory of existing old-growth and determining candidate recruitment old-growth stands to achieve the objection of maintaining ten percent old-growth forestwide. The displayed potential old-growth stands are being considered in this determination.

Thomas's definition, used in determining old-growth stands, describes old-growth as having:

1. fifteen trees exceeding 21 inches DBH,
2. a minimum of 0.5 snags per acre,
3. two or more canopy layers,
4. heart rot and other signs of decadence,
5. an overstory canopy cover of 10-40 percent, usually with a definite shrub-sapling layer with closure over 40 percent, and
6. logs obviously on the ground



OLD GROWTH MANAGEMENT UNIT MAP
FIGURE 3-13

As shown below, two of the old-growth management units are below the five percent minimum; the third unit contains 6.3 percent. On National Forest lands within the boundaries of the Decision Area, 509 acres or 2.7 percent, meets old-growth criteria. These percentages of existing old-growth are low because of the past fire history through the landscape of these three old-growth management units and past logging activities.

TABLE 3-5 EXISTING OLD-GROWTH FOREST

Old-Growth Management Unit	Old-Growth --Acres (%)-- by OGMU	Old-Growth In Decision Area	Recruitment Old-Growth Decision Area
23 *	623 (3.5%)	138 acres	549 acres
25	318 (3.7%)	318 acres	547 acres
30 *	768 (6.2%)	53 acres	361 acres
Total for the Decision Area	509 (2.7%)		1457

* These units extend outside the boundary of the Decision Area.

Fragmentation

Many species are adapted to living in the interior of an extensive forest and others utilize open environments or habitat boundaries such as wood margins (i.e. edge effect). Each species has evolved over thousands of years and its populations are adapted to a particular environment. When habitat conditions change as a result of plant succession, climatic changes, or various influences brought about directly or indirectly by humans, the survival potential of the species changes. When these changes favor a species, the population may spread into the favorable habitats and increase in size. When altered habitat conditions result in increased mortality or lowered reproductive rate, the population will decline unless it can be supported by immigration from nearby areas (Robbins, 1979).

Timber harvest, land-clearing, and other human activities tend increasingly to break large, continuous tracts of undeveloped forest land into smaller fragments isolated by a network of roads, clearcuts, and other openings. Many species which are adapted to edge effect or open environments have increased populations, while those species adapted to interior forest environments have declined. In clearcuts, for instance, populations of some birds and small animals have expanded while other species were found to decline following harvest (Medin, 1985 and 1986).

While the impacts of fragmentation on specific plant and animal species adapted to interior forest environments are not fully understood, it is clear that fragmentation affects these species in two general ways. First, there is a direct effect represented by the loss of habitat. Second, there is an indirect effect resulting from the isolation of populations remaining in the residual patches. Small isolated populations are more prone to extinction than large populations that are geographically widespread. The lack of a continuous forest cover also inhibits movement of certain plant and animal species between areas.

Especially important to interior forest habitat species are the stands of old-growth forests which are becoming isolated as connections between large, contiguous blocks of old-growth are fragmented into smaller pieces by timber harvest,

roads, fire, and other events. The ability of old-growth to provide habitat to species associated with the forest interior may be strongly influenced by stand size (Rosenburg and Raphael, 1986).

Old-growth stands are not enough by themselves because they take on the character of "islands" in a sea of seral or early-successional stages. These "islands," particularly the smaller ones, are probably incapable of sustaining the same species diversity that is present in contiguous blocks. A circular stand of 25 acres surrounded by openings is basically all edge effect (Doyle, 1990). Doyle (ibid) and others consider an 80-acre stand as approximating the minimum size for an effective reserve for interior habitat dependent species. Fragmentation threatens the value of the remaining old-growth forests, especially their value as habitat for forest interior plants and animals and other biota.

The maintenance of forested corridors connecting larger forested areas reduces the habitat loss of area-sensitive species (Robbins, 1979). Plant and animal species move between blocks of forest for dispersal and genetic exchange. Wider corridors are much more effective than narrow corridors (Noss, 1990). At a minimum, corridors must be wide enough to avoid edge effect for interior habitat dependent species. McClelland (1980) suggests a minimum corridor width of 300 feet to connect old-growth units of 50 to 100 acres. It is recommended that corridors follow creeks, also achieving protection of riparian areas and providing escape cover for other wildlife (McClelland, 1980).

Figure 3-14 depicts the current forested environment and important biological corridors. The map represents the existing habitat for interior forest species. Because harvest activity would reduce the effectiveness of an area for interior habitat dependent species, only areas without past harvest, or roads, were included in the map. Natural openings also were deleted, if they provided a potential barrier to movement of interior habitat dependent species. These openings, typically graminoid parklands, generally exceeded five acres. Roads and existing openings, both natural and human-caused, create edge effect which also degrades habitat for interior species. Edge effect was considered to extend 200 feet from an opening. As discussed above, an 80-acre stand is considered the minimum size for an effective reserve for interior-dependent species. A total 13,162 acres, broken into seven parcels, currently exists as habitat for interior species. The acreages of the seven parcels are shown below in Table 3-6.

TABLE 3-6 Acres of Interior Forested Environment

Area A	Area B	Area C	Area D	Area E	Area F*	Area H
1129	335	173	701	174	10482	168

* Area G was too small to be analyzed independently. It was combined with Area F.

Biological Corridors

Major linkages to forested areas outside the Decision area are shown. On the northwest, linkages with the Brush Lake area are provided by three 1000-2000 foot wide corridors separated by graminoid parklands. Further south on the west side, a mile-wide unfragmented corridor ties in with the Meadow Creek and East Fork of Meadow Creek drainages. On the southwest corner, another corridor approximating 2500 feet in width, ties in with forested environment in the Wall Creek drainage. Logging, roads, and past wildfires have heavily fragmented the Brush Lake, Meadow Creek, and Wall Creek areas, but sizable patches of interior forest habitat remain.

To the south, a mostly continuous forest cover along the lower stretch of Meadow Creek connects the Decision Area with the Dawson Ridge area. The Meadow Creek Road and past commercial thinning on the extreme south edge of the Decision Area have reduced the effectiveness of this corridor for some species.

The east side of the Decision Area has been heavily influenced by human activities. On National Forest lands, three narrow, forested corridors and others on private land cross the Moyie valley to the Purcell Mountains on the east. However, the effectiveness of these biological corridors is influenced by existing human barriers. The land clearing on private lands, the railroad, the Moyie River Road, and the existing 100-foot pipeline corridor all are barriers to the movement of several plant and animal species.

The north side of the Decision Area is similar to the east with only one corridor accessing the Robinson Lake area to the north. Because of U.S. Highway 95 and salvage/regeneration harvests on both sides of Round Prairie Creek, this corridor presently is minimally effective for most species. No forested corridors exist on private lands adjacent to the Decision Area.

Figure 3-14 also displays the existing and recruitment old-growth stands in the Decision Area. As shown on the map, these stands exist as isolated remnants of later successional stages remaining following past wildfires and timber harvests. These stands largely are surrounded by mid-successional forests. Riparian area corridors provide important linkages between existing and recruitment and existing old-growth stands within the Decision Area.

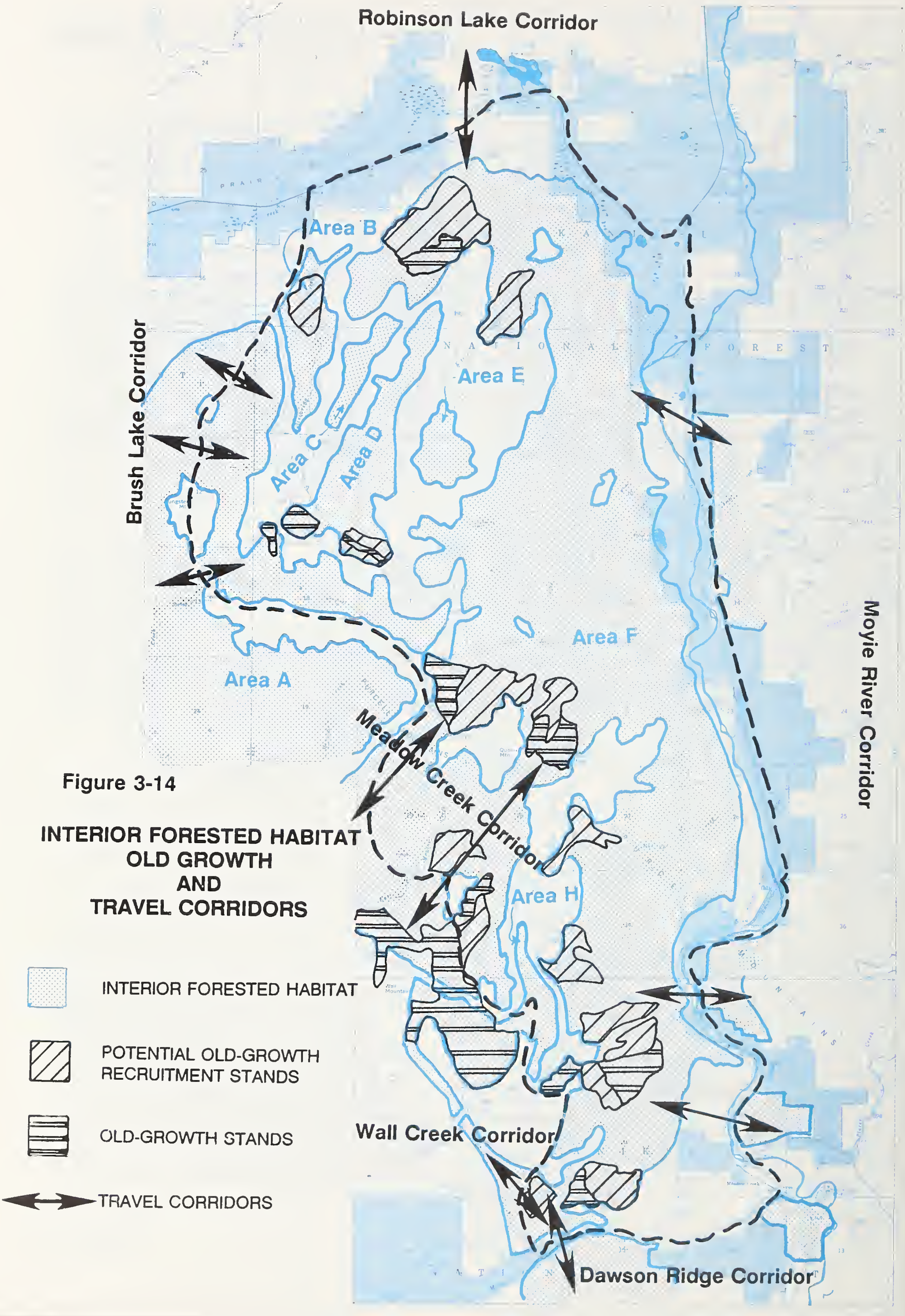


Figure 3-14

INTERIOR FORESTED HABITAT
OLD GROWTH
AND
TRAVEL CORRIDORS

Riparian Areas

Riparian areas are lands where the vegetation and microclimate are influenced by perennial and/or intermittent water, associated high water tables, and soils which exhibit some wetness characteristics. As defined in the IPNF Forest Plan, riparian areas include floodplains, wetlands, and all areas within a horizontal distance of approximately 100 feet from the normal high water line of a stream channel, or from the shoreline of a standing body of water. These areas are identifieds as Management Area 16 of the Forest Plan. The riparian areas located in West Moyie are displayed in Figure 3-15, Special and Unique Environments.

Several mountain streams drain the Decision Area. These permanent and intermittent streams are characterized by fast water flows and steep gradients. Because of their typical V-shaped stream gradient, these watercourses are banded by narrow zones of riparian vegetation, less than the 100-foot band defined in the Forest Plan. These streams, which reach into the higher elevations of the Decision Area, serve as Biological Corridors for wildlife and provide a corridor for the altitudinal migration of plants.

Streams with riparian areas include the larger named drainages of East Fork of Meadow Creek, Bussard Creek, Hellroaring Creek, Little Hellroaring Creek, Rutledge Creek, and McDougal Creeks as well as their tributaries. There are also several smaller, unnamed tributaries of Round Prairie Creek, Meadow Creek, and the Moyie River. A unique feature on Little Hellroaring Creek is the Little Hellroaring Falls. The fractured bedrock under the falls and in the spray zone contains a population of Coeur d'Alene salamander, an animal listed as a Sensitive species.

The lowlands along the Moyie River and Round Prairie Creek, on the eastern and northern boundaries of the Decision Area respectively, are important riparian areas. Beavers, mink, and moose are some of the larger animals using these riparian areas. Along both streamcourses, feeding and roosting habitat is available for bald eagles and ospreys and nesting habitat for other bird species including redstart, northern waterthrush, and MacGillvarys warbler. Because of their more extensive floodplains and flatter terrain, these streams are paralleled by larger bands of riparian vegetation. Two riparian plant communities associated with these streams are a black cottonwood red osier dogwood type and a mountain alder type. These plant communities are not located elsewhere in the Decision Area and are important habitat for a variety of biota associated with riparian ecosystems. They are similar to the community types described in Bachursky, Kenfield, and Sirueck, 1990. Another uncommon riparian plant community are the sedge meadows which border portions of Round Prairie Creek. These openings are seasonally under water during the high run-off period of spring. A majority of these lowlands were homesteaded in the early part of this century, and have been farmed or used for grazing. Much of the native riparian vegetation in these areas has been affected by these activities.

There are three small lakes in the Decision Area: high-elevation Queen Lake, and two lower elevation lakes, Bussard and Sinclair. Queen Lake, located north of Queen Mountain, is a small lake approximately five to six acres. It is rimmed by a very narrow band of riparian vegetation. Because of its higher elevation and resultant cooler temperatures and fewer ice-free days, Queen Lake contains different submergent vegetation than the two lower waterbodies. Animal, invertebrate, and insect populations also differ from Bussard and Sinclair Lakes because of Queen Lake's higher elevation. For instance, Queen Lake does not contain a population of western painted turtles, a species which inhabits both Bussard and Sinclair Lakes. Queen Lake contains a population of cutthroat trout.

The largest of the three lakes, Bussard, is located on private land in the valley floor and has not been surveyed. Bussard is a relatively shallow lake and grades into a wetland on its south end; this portion of the waterbody is dominated by shrubs and other riparian vegetation adapted to a high water table.

Sinclair Lake lies in the valley to the east of the Moyie River. This four to five acre lake contains a mat of sphagnum moss encroaching from its edge. Plant species particularly adapted to a sphagnum substrate (i.e. the base or material to

which a plant is attached and from which it receives nutrients) are associated with this vegetative mat. One such plant is the sundew (Drosera rotundifolia) an insectivorous plant. Pod grass (Scheuchzeria palustris), located on the edge of Sinclair Lake is a wetland plant species on the Watch List of the Natural Heritage Section of Idaho Fish and Game. The lake is stocked with rainbow trout by the Idaho Fish and Game.

Another important wetland, an isolated 1/4-acre sphagnum bog, is located just west of Round Prairie Creek in the northeast corner of the Decision Area. This bog is surrounded by coniferous forest of mixed species dominated by western hemlock. A portion of the bog is characterized by hummocks, or mounds, with western hemlock growing on top of the hummocks. Although this bog is small, it provides habitat for a variety of riparian species. Mud sedge (Carex limosa) was found during a sensitive plant survey; this uncommon species is associated with wetland areas. The bog may provide habitat for the northern bog lemming, which is listed as a species of Special Concern by the State of Idaho.

Riparian ecosystems are very important in maintaining biodiversity. These ecosystems may compose only a minor proportion of the total landscape, but typically contain a greater quantity and diversity of plant and animal life than adjacent upland areas. Riparian areas supply food, cover, and water for a large diversity of animals. They also serve as migration routes and forest connectors between habitats for a variety of wildlife, particularly big game and birds (Thomas et.al., 1978).

The condition of riparian ecosystems affects fish, amphibian, reptilean, and other aquatic species. Aquatic vegetation provides a food source for many species, from insects to moose. The high insect population associated with the bodies of water attracts a correspondingly high population of insect-feeding bats and birds, such as swallows and swifts. Moreover, these ecosystems contain a disproportionate number of species which have been identified as sensitive species such as the Coeur d'Alene salamander and plants such as soft rush and Botrychium spp.

Special or unique environments

Besides old-growth and riparian ecosystems, several other special or unique environments exist within the West Moyie area. Such unique environments, including rock sites, graminoid parklands, avalanche chutes, and stands of hardwood trees; provide habitat for a number of species. The identification of these uncommon areas is important in the planning process (Forman). Though isolated, and often small, these unique environments provide important contributions to biological diversity.

Graminoid parklands are natural openings dominated by grasses and forbs, both annuals and perennials. These parklands typically are located on a shallow soil layer above bedrock, and are interspersed with rock outcroppings and scattered trees. Several plant species including spring beauty (Claytonia lanceolata), parsnip-flowered eriogonum (Eriogonum heracleoides), and elliptic-leaved beardtongue (Penstemon ellipticus) are specially adapted to these harsher environments.

In the West Moyie area, parklands usually are located on ridgelines or the upper third of slopes adjacent to Douglas fir/ninebark habitat types at lower elevations and subalpine fir/beargrass and subalpine fir/menziesia at higher elevations. These openings in the Decision Area vary from several hundred acres to small microsites of less than 1/4 acre. Many of the smaller areas exist as inclusions in otherwise heavily-timbered stands. The larger areas have been designated as Management Area 9 in the Forest Plan. Management Area 9 is defined as non-forest lands or lands not capable of producing industrial products.

Another non-forested rockland environment is scree - a slope covered with loose fragmented rocks. Unlike graminoid parklands, scree lacks soil so vegetation is often limited to mosses and lichens. As shown on Figure 3-15, two low-elevation scree areas exist in the Decision Area--one on the north end and one on the south end. The western skink (Eumeces skiltonianus) is a common reptilian inhabitant of lower elevation scree slopes.

Two major avalanche chutes occur in drainages east of Queen Lake. The chutes vary in width between 50 and 300 feet. Because of the steep gradient of the drainages, repeated snow movement has kept trees from becoming established. Both chutes are dominated by Sitka alder, whose flexible stems allow this shrub to survive the snowslides. No floristic survey documenting other plant species has been completed for these areas. However, wet-site forbs including cow parsnip, angelica, and lady fern are most likely to be common as well as other biota adapted to wetter environments. The forbs associated with avalanche chutes normally provide quality forage for bears. Mountain goats commonly were seen on the rock outcrops adjacent to the avalanche chutes during the 1930s and 1940s.

Though individual hardwood trees are scattered through the Decision Area, stands of hardwood trees are uncommon. Due to the seral nature of hardwoods in a coniferous ecosystem, hardwood stands are transitory and are generally replaced by shade-tolerant species in the future. In the Decision Area, these stands are widely scattered. An overstory of either quaking aspen, paper birch, or black cottonwood exists with a variable understory of species depending upon which habitat type the stand occupies. Some bird species which utilize these upland broadleaf areas include the Nashville warbler, ruffed grouse, and pileated woodpecker.

At higher elevations in the Decision area, small Sitka alder thickets with a miner's lettuce understory exist as another unique environment. These sites may be associated with a specific soil-type or a seasonal variation in the water table. These hardwood thickets are scattered sporadically in small patches averaging less than 1/4 acre and are associated with subalpine fir habitat types. These microsites provide abundant browse and thermal and hiding cover for wildlife (Cooper, et.al., 1987).

On the low-elevation flat areas along the Moyie River there are "deer yarding areas." A combination of a dense tree overstory canopy with good snow intercepting ability and an understory of western red cedar provides an important quality wintering range for white-tailed deer in these areas during periods of heavy snows. Moose also commonly utilize these locations. An example of this valuable wildlife habitat exists between Sinclair Lake and the Moyie River.

Special Interest Areas important areas from a vegetative standpoint, include Botanical Areas and Research Natural Areas. They are reserved areas where no management activities are scheduled or anticipated because of their unique qualities. No such areas have been identified in the West Moyie Decision Area.

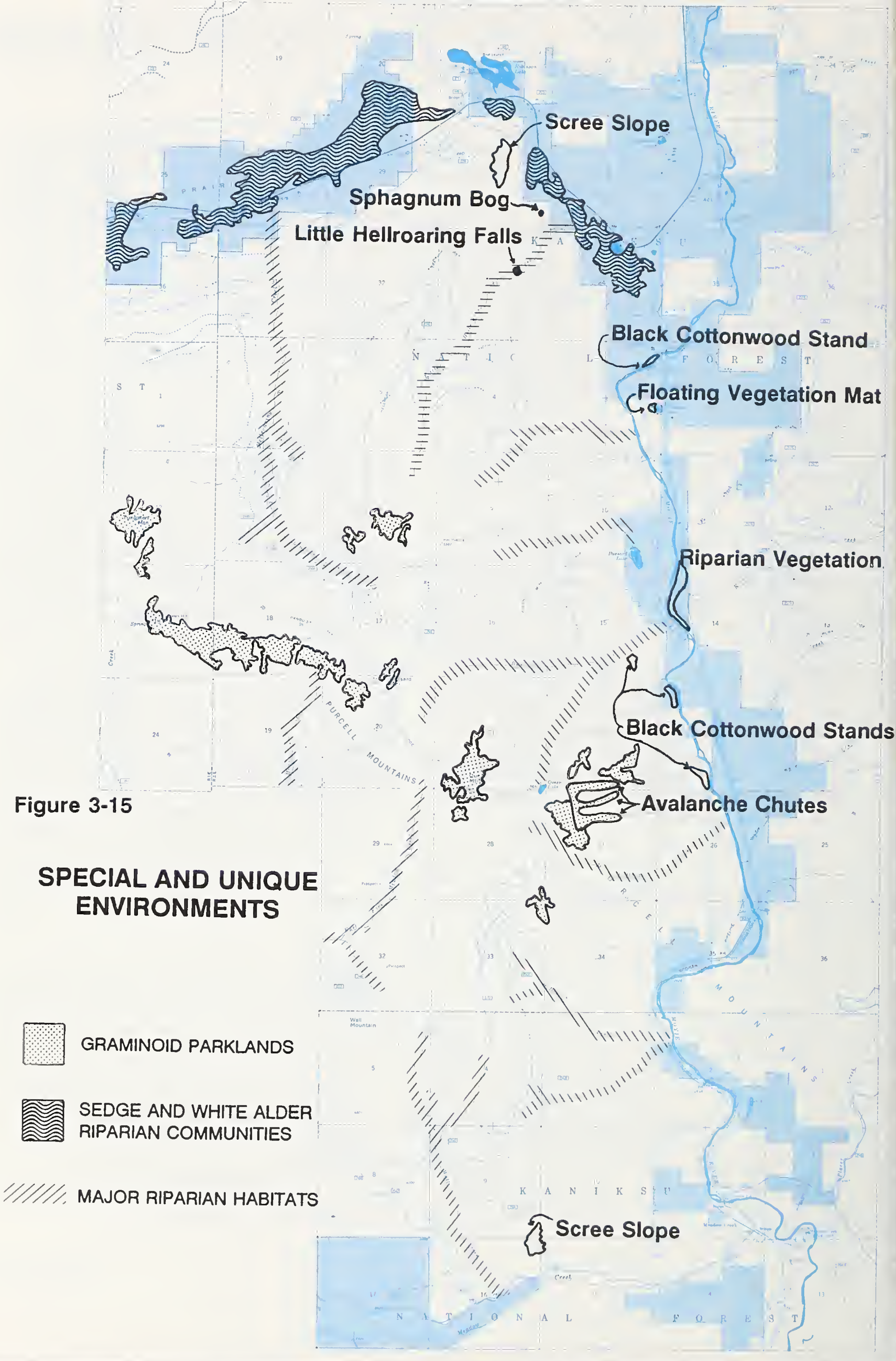


Figure 3-15

SPECIAL AND UNIQUE ENVIRONMENTS

Threatened, Endangered, and Sensitive Plants

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on the lands in public ownership. When a plant species population is naturally rare or shows evidence of decline which threatens population viability, it is identified as a species requiring special consideration. The additional protection given these native plant species helps to reverse population declines and to maintain these species as part of the ecosystem.

Species recognized by the Forest Service as needing such considerations are those that:

(a) are designated under the Endangered species Act as Endangered or Threatened,

(b) are under consideration for such designation, or,

(c) appear on the Regional Sensitive species List. Sensitive species are those plant and animal species identified by the Regional Forester for which population viability is a concern because of significant current or predicted downward trends in populations or in habitat that would reduce a species existing distribution.

The U.S. Fish and Wildlife Service does not show any plant species listed as threatened or endangered as occurring in the Decision Area (USFWS letter 1-4-89-SP-205).

The *Sensitive Plant Field Guide, Idaho Panhandle National Forest - Kaniksu National Forest*, 1989, and *Caring for Our Natural Community: Region 1, Threatened, Endangered, and Sensitive species Program*, 1989, provided the list of the sensitive species for which surveys were conducted. species listed under the various categories established by the Idaho Native Plant Society including Federal Candidate Taxa; Idaho State Priority 1 Taxa; Idaho State Priority 2 Taxa; Idaho State Sensitive Taxa; Idaho State Monitor Taxa; and Idaho State Review Taxa were also noted. These various categories are defined in the glossary. The listings of the Idaho Native Plant Society often provide the basis for additions to the Regional Sensitive Plant List.

Revision of the Regional Sensitive Plant list occurs at frequent intervals, with species being deleted or added according to the most recent information. There are several species which have a possibility of occurrence in the Decision Area which have been recommended to the Regional Forester for addition to the Sensitive species list.

Surveys for sensitive plant species have been conducted over the past two years in the West Moyie area. Floristic surveys were conducted as cooperative cost share projects between the Idaho Panhandle National Forests and the Natural Heritage Section of Idaho Fish and Game. These surveys involved wetland habitats (Mosley, 1989) and the genus *Botrychium* (Mosley and Lorraine, 1990). Additionally, a majority of the areas involved in the proposed alternatives were surveyed by Forest Service Biologists for sensitive plants including tentative road and unit locations (Norris, 1990 and Sieracki, 1990).

Table 3-7 lists sensitive, watch and other unique plants located during with these surveys and their classification status. As shown on Map 3-16, two sensitive species were located within the boundaries of the Decision Area: wool grass (*Scirpus cyperinus*) and soft rush (*Juncus effusus var. pacificus*). Since then, wool grass has been proposed for removal from the sensitive species list. However, until the proposal for de-listing of this species has been approved by the Regional Forester, the wool grass site will be protected.

The positive identification of specimens of soft rush (*Juncus effusus*, var. *pacificus*) has been confirmed since the printing of the DEIS. Soft

rush occurs at two sites in a wet meadow complex located west of Sinclair Lake in a grazing allotment. Protection measures include fencing the site to exclude livestock. See the Biological Evaluation in Appendix B for a more thorough discussion of these plants.

One species which occurs in the Decision Area, mud sedge (*Carex limosa*), has been removed from listing by the Idaho Native Plant Society since the completion of the surveys because of its common occurrence (Mosley and Groves, 1990).

Two other *Carex* species were discussed in the West Moyie DEIS. Both *Carex flava* and *Carex lenticularis* were believed to have been located in the wetlands immediately outside the Decision Area boundary. The specimens believed to be *Carex flava* were misidentified, and have been verified as another species. Upon re-visiting the site, the location of the *Carex lenticularis* specimen was not found.

TABLE 3-7

Sensitive and rare plant Taxa Occurring on the West Moyle

Common Name	Scientific Name	Status
Arrowleaf Coltsfoot	Petasite sagittatus	Idaho State Monitor List
Pod Grass	Scheuchzeria palustris	Idaho State Monitor List
Mud Sedge	Carex limosa	Dropped from consideration in Idaho
Soft Rush	Juncus effusus var. pacificus	USFS R1 Sensitive; northern Idaho and Idaho State Monitor List
Sundew	Drosera rotundifolia	No status; insectivorous plant of interest

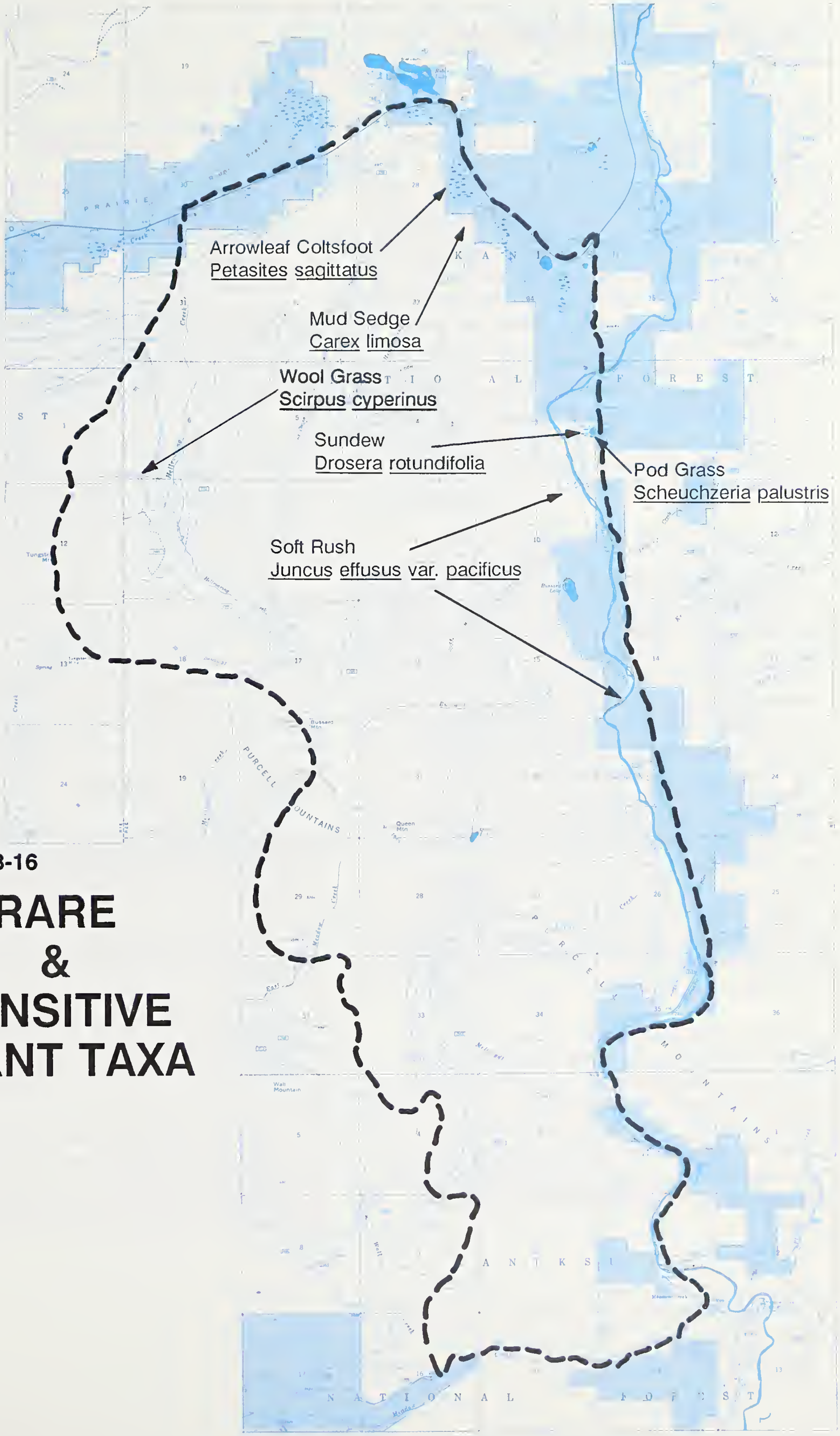


Figure 3-16

RARE & SENSITIVE PLANT TAXA

Management Indicator species

The National Forest Management Act regulations specify that the Forest Service assess impacts on selected indicator species. Management Indicator species are discussed in depth in the Wildlife portion of this chapter. Population declines in these species could indicate corresponding declines in the health of their associated environments. For instance, the Management Indicator species identified in the IPNF Forest Plan represent the habitat needs of many of the other 380 animal species inhabiting the Forest. Management Indicator species therefore are important measures of biodiversity.

Large standing and down woody material

Biodiversity also includes the presence of standing dead trees (i.e. snags) and downed woody material. As explained in the wildlife portion of this chapter, snags, broken-topped live trees, and down logs are used by a great variety of wildlife species for nesting, denning, perching, roosting, feeding, and cover. Forty-two species of birds, including ten species of woodpeckers; fourteen species of mammals; and several species of amphibians are recognized as totally or largely dependent on cavity habitat on the Idaho Panhandle National Forests (IPNF, 1985). Moreover, a variety of other invertebrates, microbes, and insects all utilize dead trees or downed woody material. Burried rotten wood is important to mycotrophic plant species because it retains moisture and provides organic substances essential to the associated mycorhizal fungi (internal document, ref A).

Another important function of dead and down trees involves riparian areas. Dead trees located where they can eventually fall into streams and lakes are important in contributing to aquatic habitat through creation of pools, cover, and spawning habitat. Downed woody recruitment into streams and other bodies also provides important habitat for a variety of reptiles and amphibian species.

Soil

The life forms residing and interacting in forest soil range from the smallest, most primitive organisms all the way up the evolutionary ladder (Amaranthus, et.al., 1989). The forest floor and forest soil contain diverse species including microfauna such as protozoa and nematodes; and larger macrofauna such as earthworms, snails, spiders, beetles, and ants. A square meter of surface soil may encompass a thousand or more species of soil animals and several million individuals (Powers, 1989). The subsurface also is inhabited by several reptile and mammal species.

Plants are dependent upon the intense biological activity that surrounds their root systems. Mycorrhizae, specialized species of fungi, are present in great numbers near the feeder roots of trees. They play an integral role in carbon cycling, nutrient transfer, and water availability to the plant species above ground. Most of the tree species could not survive in the natural forest environment without mycorrhizae (Amaranthus, et.al., 1989).

Soil organisms are important in the formation of soil itself. This process begins with the fragmenting of dead material into smaller pieces by a variety of species. Leaves, needles, and other plant tissue which has fallen to the forest floor is attacked by mites, millipedes, snails, beetles, and other soil organisms. The remnants are decomposed by other species. Wood fallen to the forest floor is attacked by beetles and various fungi species that break down the cellulose and lignin. Insects, amphibians, worms, reptiles, and mammals concentrate around this woody debris. They enhance the soil productivity by mixing and aerating the soil and transporting nutrients and the spores of mycorrhizae fungi from one location to another (Amaranthus, et.al., 1989). As an example, the flying squirrel feeds on the fruiting bodies of various mycorrhizae, and spread the spores in their feces.

INTRODUCTION

This part of Chapter 3 deals with the existing vegetative condition in the West Moyie area. The following sections discuss the timber resource. The age/condition classes, suitable acres and timber growth and yield are shown as conservative estimates of the volume and growth that currently exists in the Decision Area. The existing or potential threat to the timber in the Decision Area from insects and disease is also a major factor in the environment in the West Moyie area.

To give you a broader knowledge of the current situation in the area, past harvesting and acres harvested are displayed. Regeneration accomplishments are summarized, as well as the precommercial thinning that has been completed since 1975.

The vegetation discussion ends with a section on noxious weeds.

THE TIMBER RESOURCE

Timber Suitability

Suitable forest lands are defined as those lands

(a) for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions;

(b) for which there is reasonable assurance that such lands can be adequately restocked;

(c) and for which there is management direction that indicates timber production is an appropriate use of that area (IPNF Forest Plan, 1987).

Within the West Moyie Decision Area, suitable forest lands are included in Management Areas 1 (Timber), 4 (Big Game Winter Range/Timber), and 16 (Riparian Areas).

Conversely, unsuitable forest lands are those lands not selected for timber production during development of the Forest Plan. Reasons for designating these areas as unsuitable include multiple use objectives that preclude timber production, other management activities that limit timber production activities, and lands that are not cost-efficient over the planning horizon in meeting forest objectives that include timber production. Lands not appropriate for timber production also are designated as unsuitable in the Forest Plan (IPNF Forest Plan, 1987). Such areas include graminoid parklands, scree, and other non-forest or marginal lands.

Age-Class Distribution

An objective of the IPNF Forest Plan is that "the forest will be managed for a balanced age-class distribution and long-term sustained yield" (Idaho Panhandle National Forest Plan, 1987). To measure age-class distribution, the Forest Plan used condition classes, a broad grouping of ages. These condition classes include: (1) seedling/sapling, (2) poletimber, (3) immature sawtimber, and (4) mature sawtimber. A stand of trees will spend roughly 2.5 decades in each condition class. Once a stand reaches the mature sawtimber category, however, it will remain in this class until it is regenerated to seedling/sapling status again by a management activity or a natural occurrence such as a forest fire.

Figure 3-17 shows the percentage of total suitable acres currently in each timber condition class and indicates the approximate size/age of the vegetation in each class.

Condition Classes

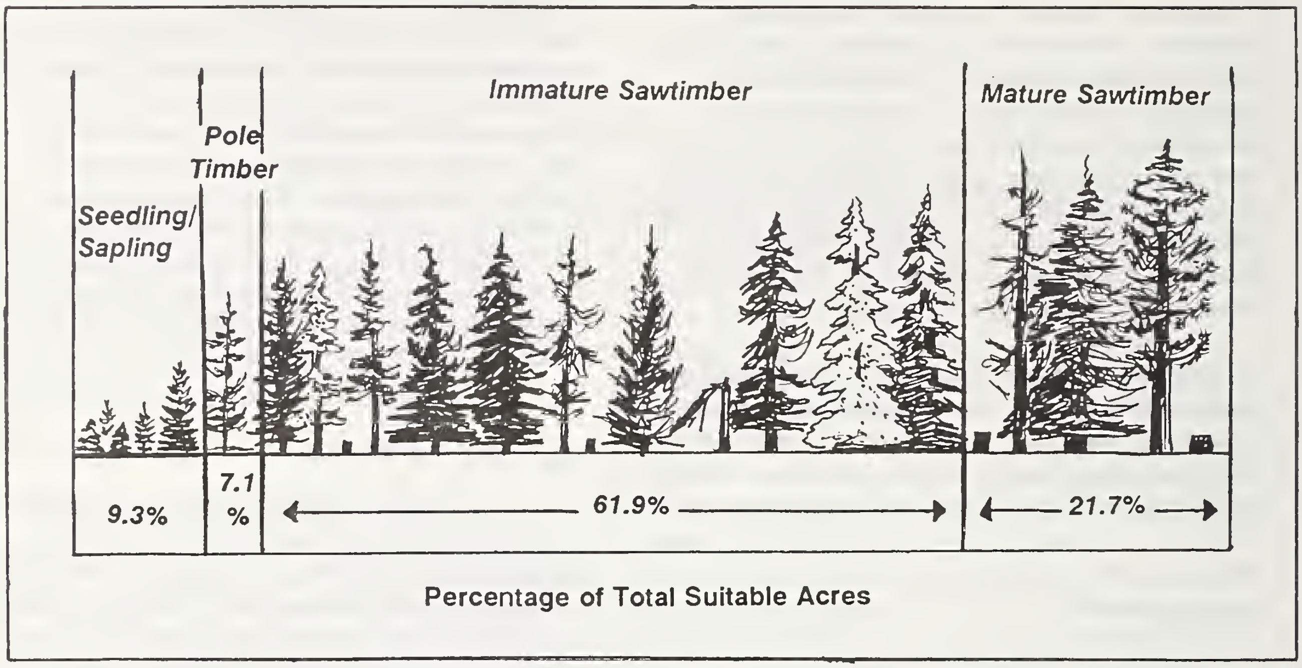


Figure 3-17

The percentage of condition classes by compartments in the West Moyie Decision Area is displayed in Table 3-10. The acres total more than Decision Area because several compartments extend outside the boundary. The proportions of condition classes, however, are representative of the distribution for the Decision Area as a whole. As shown by the Figure 3-17, Table 3-8, and Figure 3-18, a smaller proportion of acres lie in the two younger condition classes, seedling/sapling and poletimber than in the other two older conditions classes. A good distribution of age classes would show roughly equal proportions of acres in each condition class.

Table 3-8 displays the proportion of condition classes found in the West Moyie Decision Area.

TABLE 3-8
CONDITION CLASS

COMPARTMENT SUB-COMP	SEED/ SAP	POLE	IMMATURE SAW	MATURE SAW	UNSUIT-ABLE ACRES	SUITABLE ACRES	TOTAL ACRES
727-02 % SUITABLE AC	316 AC 6.5%	207 AC 4.2%	3176 AC 65.0%	1190 AC 24.3%	879 AC	4889 AC	5768 AC
727-05 % SUITABLE AC	46 AC 2.4%	0 AC 0%	1555 AC 83.4%	262 AC 14.1%	493 AC	1863 AC	2356 AC
730-ALL % SUITABLE AC	167 AC 4.3%	55 AC 1.4%	3019 AC 77.2%	669 AC 17.1%	2267 AC	3910 AC	6177 AC
735-ALL % SUITABLE AC	444 AC 11.6%	245 AC 6.4%	2554 AC 66.9%	571 AC 14.9%	1625 AC	3814 AC	5439 AC
738-02 % SUITABLE AC	478 AC 15.6%	380 AC 12.4%	1131 AC 36.9%	1076 AC 35.1%	875 AC	3065 AC	3940 AC
738-05 % SUITABLE AC	346 AC 18.7%	491 AC 26.5%	567 AC 30.6%	448 AC 24.2%	1389 AC	1852 AC	3241 AC
TOTAL ACRES BY CLASS	1797 AC	1378 AC	12002 AC	4216 AC	7528 AC	19393 AC	26921 AC

PERCENT OF TOTAL SUITABLE ACRES BY CONDITION CLASS

	SEED/ SAP	POLE	IMMATURE SAW	MATURE SAW
	9.3%	**7.1%**	**61.9%**	**21.7%**

For suitable acres in the Decision Area, Figure 3-18 displays the percentage of area by condition class.

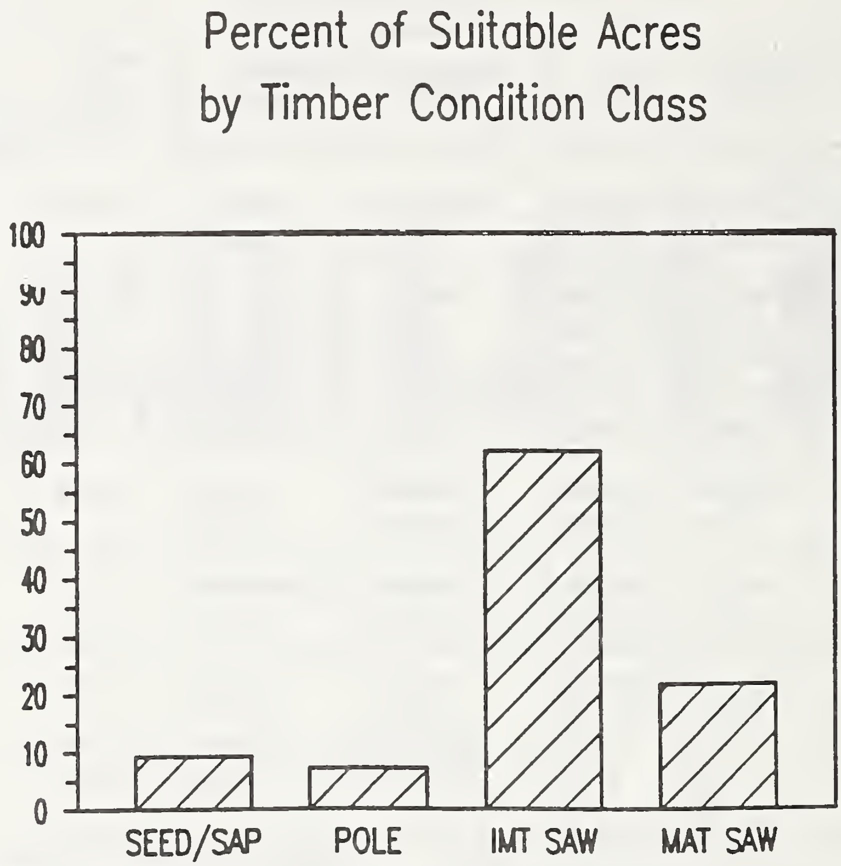


Figure 3-18

Growth and Yield

Because such a high proportion of the area is occupied by the sawtimber condition classes, the West Moyie Decision Area contains considerable standing timber volume.

Table 3-9 Volume Summary displays the estimates of standing volumes for the inventoried stands representing 82 percent of the total area. Seral species including larch, Douglas-fir, lodgepole pine, white pine, and spruce are the major species by volume.

TABLE 3-9
STANDING VOLUME SUMMARY

COMPARTMENT SUB-COMP.	TOTAL MBF LIVE VOLUME	TOTAL MBF DEAD VOLUME
727-2	28,944	2,092
727-5	16,303	570
730-ALL	35,917	3,162
735-ALL	35,138	1,021
738-2	41,261	710
738-5	12,595	444
TOTAL MBF	170,159	7,999

SOURCE: TSMRS Data Base Query 4/20/89

The Hellroaring Roadless Area includes approximately:
25% of compartment 727-5, 40% of compartment 735,
80% of compartment 730, 30% of compartment 738-5.

The following Table 3-10, shows the average periodic annual increment (pai) for the examined stands in the Decision Area. Periodic annual increment is a measure of the yearly growth, and is measured in cubic feet. Both tables 3-9 and 3-10 represent the averages of all inventoried stands in the compartments included in the West Moyie Decision Area. The inventory of these stands has been conducted from the 1970s to the present.

The figures in the tables represent the data at the time of inventory, and were not adjusted for growth and mortality. However, these figures provide reasonable conservative estimates of the volume and the growth that exists in the Decision Area.

TABLE 3-10
AVERAGE PERIODIC ANNUAL INCREMENT (GROWTH)

COMPARTMENT--SUB-COMPARTMENT	CU. FT.	NUMBER OF STANDS
727--2	71.2	28
727--5	66.0	26
730--1	62.1	21
730--2	76.4	38
730--3	73.8	7
735--1	84.6	51
735--2	1.4	20
738--2	96.4	115
738--5	85.3	26
TOTAL STANDS		332

WEIGHTED AVERAGE GROWTH 84.7 CuFt per year

INSECTS AND DISEASE

A variety of forest insects and diseases exist in the Decision Area. The majority of these insects and disease are present in low endemic levels, and are not significantly affecting the growth and vigor of forest stands. Other forest pathogens, however, constitute an existing or potential threat to the stands in the West Moyie area. These are discussed below.

White Pine Blister Rust (Cronartium ribicola)

The white pine blister rust, caused by the fungus *Cronartium ribicola*, has caused the largest change in the stands in the West Moyie area. Considerable mortality has occurred in those stands where white pine is a major component. Some stands have been so impacted by the mortality that they are in need of silvicultural rehabilitation. For these latter stands, highly productive land presently is only partially occupied by trees.

Because white pine blister rust is an introduced pathogen and the stands in the West Moyie area have only recently been exposed, natural resistance levels are considered to be very low--less than one percent (Hoff, 1990). Mortality therefore can be expected to continue at high levels.

Map Figure 3-19 includes stands which have a high risk to white pine blister rust. Those stands with more than three thousand board feet (MBF) per acre of western white pine were considered high risk.

Mountain Pine Beetle (Dendroctonus ponderosae)

The mountain pine beetle flourishes in stands of mature lodgepole pine, especially in stands where the average age is greater than eighty years old. Lodgepole pine is an aggressive pioneer species following forest fires. Because of the fire history of the Moyie area around the turn of the century, this species is found in nearly all stands in amounts varying from a few scattered trees to stands of pure lodgepole pine.

A risk rating system has been developed to assess likelihood and effects of a mountain pine beetle epidemic for lodgepole pine stands. (Amman, et al, 1977). Using the factors of elevation, average age, and average DBH of the pine, all stands of sawtimber-sized lodgepole pine in the West Moyie Decision Area rate either moderate or high risk.

If a mountain pine beetle epidemic occurs, mortality of lodgepole pine in a stand of moderate risk can be expected to be 25 to 50 percent. Mortality in a high risk stand can be expected to exceed 50 percent. At least 3458 acres in the West Moyie area have been rated as high risk; these stands are shown on Figure 3-19.

Aerial and ground reconnaissance over the past five years indicates mountain pine beetle populations in the Moyie area to be at high endemic levels/low epidemic levels. The Bonners Ferry Ranger District has been watching closely as a severe mountain pine beetle epidemic has progressed westward from Glacier Park and the Flathead National Forest to the Kootenai National Forest.

Large areas of the Yaak Ranger District of the Kootenai National Forest, which borders the Bonners Ferry District to the east, have been devastated by the epidemic. The potential for major mortality of pine stands on the Bonners Ferry District within 10 to 15 years is very high (Gibson, 1990).

If this epidemic does spread into the Moyie, the effects will be dramatic. Given an epidemic with no pre-treatment of stands or no salvage of the dead trees, the same progression of events would happen as have occurred on the Yaak Ranger District. Mortality would spread quickly. There would be three to ten years of red foliage as green trees continue to die, which would be followed by ten to twenty years of "gray ghost forest" after the red needles fall from the dead trees and the bark sluffs from the bole.

Dead and downed fuel accumulations would build as the trees fall to the ground. As has occurred on the Kootenai National Forest and Glacier Park in recent years, a stand-replacement wildfire could be expected at some point in the epidemic because of the heavy fuel loadings.

A variety of silvicultural systems could be used to reduce the risk of a mountain pine beetle epidemic depending on the management objectives and the proportion of lodgepole pine within a particular stand. The following is a summary of silvicultural possibilities based on the relative amount of lodgepole pine within a stand:

NEAR PURE LODGEPOLE STANDS,
HIGH BASAL AREA (over 180 sq.ft.)

Limited to regeneration systems--clearcut, seed tree, and shelterwoods.

NEAR PURE LODGEPOLE STANDS,
MODERATE BASAL AREA (100 to 180 sq.ft.)

Can basal area thin to reduce beetle risk.
Can regenerate stand by clearcut, seed tree or shelterwood systems.

MIXED SPECIES, HIGH PINE COMPONENT

Sanitation/salvage of all pine would result in a regeneration harvest of a shelterwood nature.

MIXED SPECIES, LOW PINE COMPONENT

Sanitation/salvage of all pine would result in a form of thinning.
Can regenerate stand by seed tree or shelterwood system.

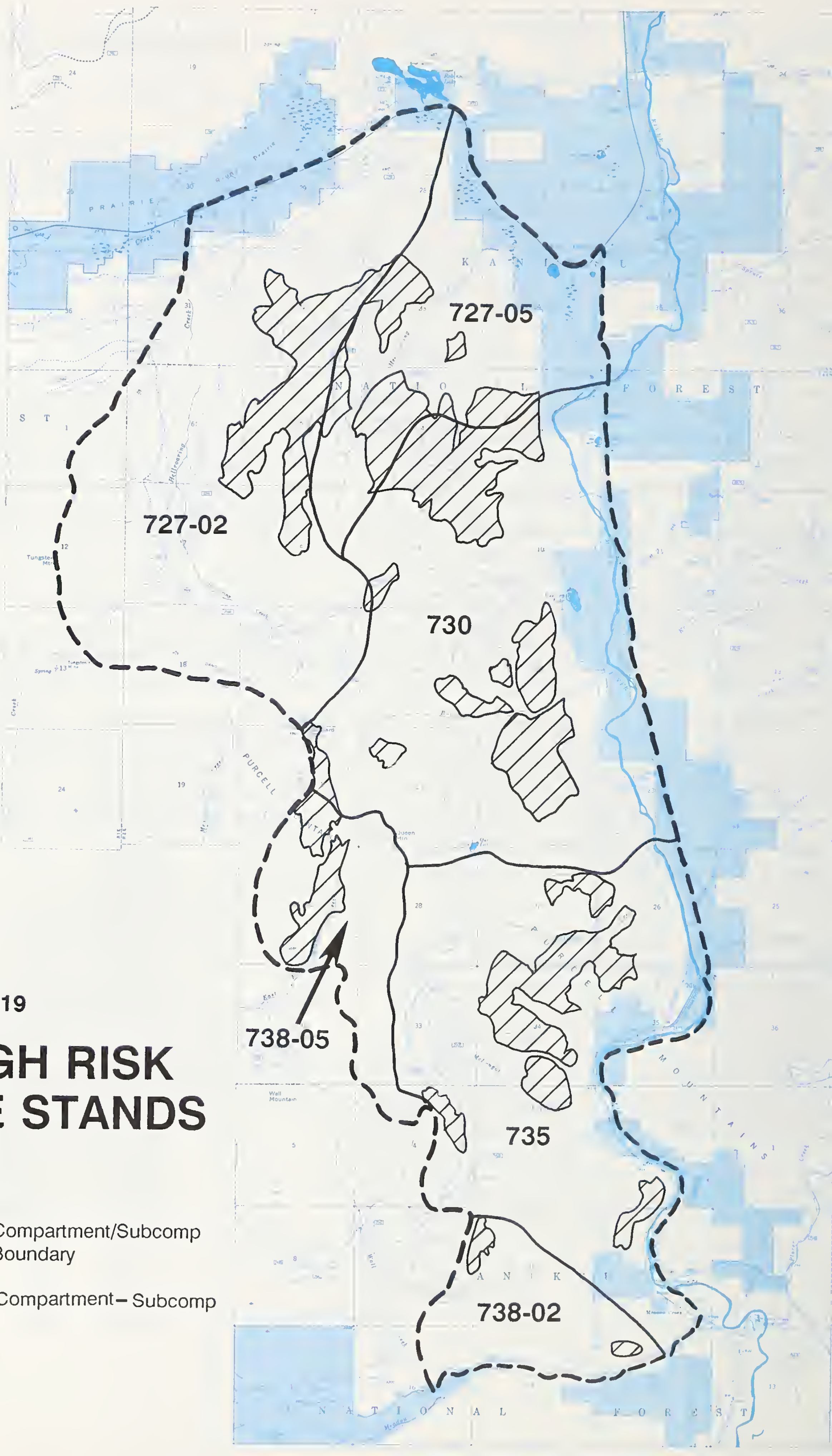


Figure 3-19

HIGH RISK PINE STANDS

Compartment/Subcomp Boundary

727-02 Compartment– Subcomp

Root Diseases

Extensive tree mortality and growth loss occur over long periods of time as a result of root disease. Root diseases have been recognized in many stands in the Decision Area, particularly along the lower slopes above the Moyie River. Root diseases probably occur elsewhere in the habitat types where these pathogens are commonly prevalent. Those habitat types especially susceptible to damaging root disease include the Douglas-fir series on south aspects, the grand fir series, and the western hemlock series (Byler et al, 1990).

The two most important species of damaging root diseases include *Phellinus weirii* and *Armillaria*. Douglas-fir and grand fir trees are especially susceptible to these root diseases (Byler et al, 1990). All species, however, can be affected by root diseases, especially in the seedling and sapling stages. Mortality occurs in individual trees or small pockets of infection.

Root disease is the most serious pest problem on the Idaho Panhandle National Forests. A recent study involving 110 plots in root disease pockets in six commercial-sized stands in northern Idaho showed that losses in volume increased at a rate of five to six percent per year (equivalent to 1100 board feet per acre). In this five-year study, 25 percent of all Douglas-fir died and 41 percent of the remaining live trees were infected (Idaho Forest Pest Conditions and Program Summary, 1989).

The impact and effects of the root diseases can be expected to continue to increase; especially in the stands where a major component of white pine is being removed by blister rust. These stands have developed with endemic levels of root disease present. With the introduction of an introduced pest (blister rust) and resultant mortality, the stands have lost a natural buffer to root disease. (Byler, et al. 1990).

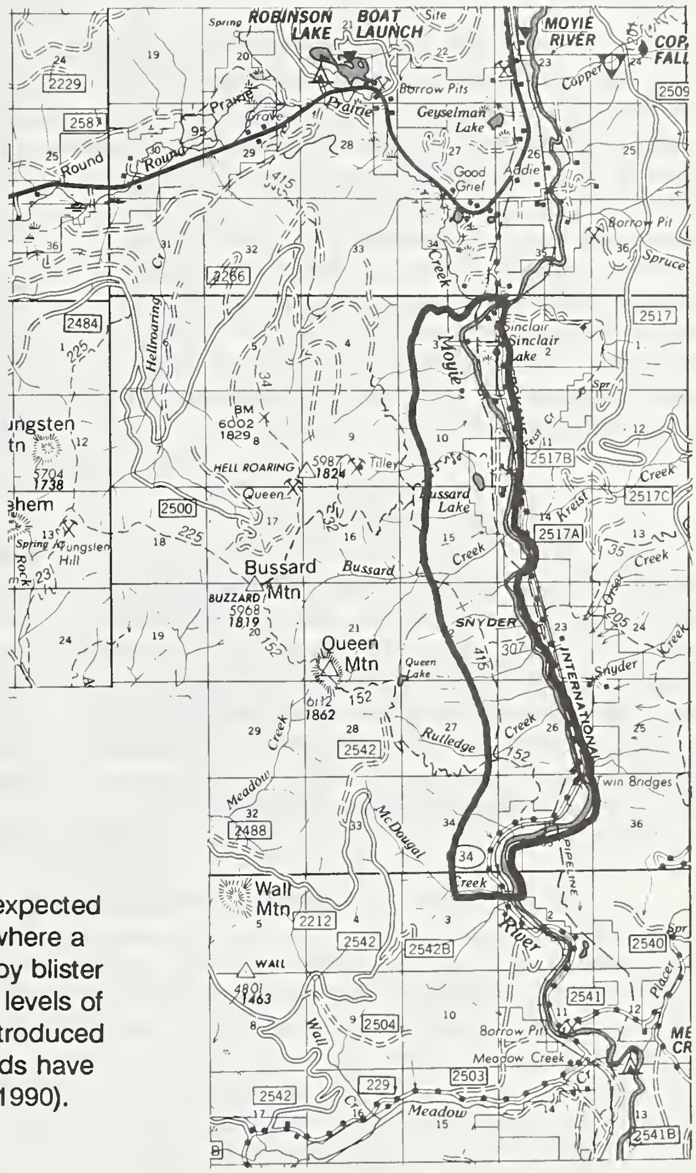


FIGURE 3-20 STANDS WITH HIGH RISK OF ROOT DISEASE

Mistletoe

The parasitic stem and needle pest, dwarf mistletoe, *Archeuthobium* spp., is another disease which occurs in the Decision Area. The major host in the West Moyie area is western larch. Minor infections of Douglas-fir and lodgepole pine also exist.

Dwarf mistletoe plants cause stem cankers or deformities such as witches brooms or swelling of the stems and branches of host trees. Significant height and diameter reductions result in heavily infected areas, especially in young seedling and sapling stands. The most serious threat occurs when regeneration is overtopped by an infected overstory; seed from the mistletoe plants can fall and infect the regeneration. Infected regeneration may suffer from increased mortality with drastic effects on merchantable yields resulting in timber yields less than 20 percent of their potential (Van Sickle and Smith, 1978).

PAST HARVEST, REFORESTATION, AND CULTURAL WORK

Records of logging activity prior to 1950 are sketchy for National Forest lands. The earliest recorded logging in the Decision Area occurred in the 1920s when Hedlund built a log chute to transport logs out of Wall Creek. This chute extended approximately 3.5 miles up the creek. Hedlund completed logging in Wall Creek about 1929, but subsequent clean-up and extended operations continued in that drainage and neighboring areas (McGinnis, 1987 pers. comm.).

In *History of Boundary County, Idaho* (McGinnis, 1987), references are made to the small communities of Addie and Sinclair along the railroad on the eastern boundary of the Decision area. Though logging was an important employer in these communities, specific locations of logging operations were not discussed in the publication. Salvage of fire-killed timber along the lower slopes of the Moyie Valley to use for ties in the construction of the railroad did occur at several locations. Transcontinental passenger service had been initiated on the railroad in 1909.

In the 1960s, a computerized record-keeping system was developed to track various activities on a stand basis. This record is accurate for regeneration harvests and reforestation activities which have occurred since 1970. Tables 3-11, 3-12, and 3-13 are results of queries to this data base.

Table 3-11 depicts the acres of timber harvest by harvest method for those compartments which are included in the West Moyie Decision Area. Harvest methods include even-aged regeneration harvests such as clearcut, seedtree, and shelterwood; intermediate harvests of commercial thinning, sanitation or salvage cuts; or uneven-aged treatments including individual tree selection.

TABLE 3-11

ACRES OF HARVEST BY HARVEST TYPE

Compartment	Clearcut		Seed-Tree / Shelterwood		Intermediate Selection		
	1960-79	1980-89	1960-79	1980-89	1960-79	1980-89	1960-79
727	319	472	0	243	19	104	0
730	0	101	0	0	0	0	0
735	154	70	0	86	155	111	47
738	529	29	7	120	565	273	0
Subtotal	1002	672	7	449	739	488	47
Total by Type	1674		456		1227		47

Source: TSMRS Data Base Query, 1989

Table 3-12 shows the acres of reforestation that have been accomplished in the compartments making up the Decision Area. As shown, approximately 1200 acres of planting and 450 acres of natural regeneration have been completed.

Planting became common following timber harvest during the 1950s, and was almost used exclusively through the 1960s and 1970s. Since then, more emphasis has been placed on natural regeneration techniques including seed-tree and shelterwood harvests.

TABLE 3-12
SUMMARY OF REGENERATION ACCOMPLISHMENTS

Compartment	Planting Period			Planting	Natural
	Pre-1980	1981-85	1986-89	Totals	Regeneration
727	121	105	120	346	243
730	0	0	55	55	0
735	0	19	96	115	86
738	492	132	34	658	127
Period Totals	613	256	305	1174	449

To be certified as reforested, a stand must meet the following criteria as set forth in USFS Reforestation Handbook, FSH 2409.26b R-1:

1. Establishment:

a. The required natural regeneration has survived at least three full growing seasons, is in healthy condition (healthy leaders and buds), and is a minimum of 6 inches high.

b. Planted stock has survived two growing seasons and is in healthy condition (healthy leaders and buds).

2. At least 90 percent of the reforestable land area in the stand meets the prescribed stocking standards.

3. The district silviculturist has determined the stand is satisfactorily stocked.

Stocking standards on the Idaho Panhandle National Forests as established in the Forest Plan are:

High productivity sites
(cedar and western hemlock habitat series)
400 evenly spaced crop trees per acre.*

Moderate productivity sites
(grand fir, moderate subalpine fir, and mesic Douglas-fir habitat series)
300 evenly spaced crop trees per acre.*

Low productivity sites
(cold, dry subalpine fir habitat series)
200 evenly spaced crop trees per acre.*

* This minimum may be adjusted by individual stand prescriptions which reflect site-specific conditions. (USFS, 1987)

Since 1976, the Bonners Ferry Ranger District has accomplished major reforestation efforts. Through that period, 18,108 acres have been planted and 2983 acres have been scheduled for natural regeneration. A total of 10,948 acres of plantations

and 950 acres of natural regeneration have been certified as reforested. There are 7149 acres of plantations and 2033 acres of natural regeneration that are judged as progressing satisfactorily toward certification. There is currently one plantation of eleven acres that is not satisfactorily stocked according to established stocking standards. All stands scheduled for natural regeneration are satisfactorily reforested (Data from timber stand data base queries).

After regeneration is established, cultural work such as precommercial thinning and release work is often employed to improve the value and productivity of a stand. By thinning excess trees or releasing individual trees from competing vegetation, growth can be concentrated onto the very best trees in the stand, creating larger, more valuable products (Daniel, et.al., 1979).

Cultural work also provides other important functions in a managed stand. The species composition of the stand can be controlled to buffer against potential insect and disease problems. By favoring those species which have fire resistant characteristics, thinning can improve the ability of a stand to withstand a future wildfire. Wildlife, recreation, and scenic values also can be enhanced by thinning.

Table 3-13 summarizes the thinning and release work that has been accomplished in this area.

TABLE 3-13

PRECOMMERCIAL THINNING & RELEASE ACCOMPLISHMENT

Compartment	Thinning Period				Total
	Pre 1975	1976-80	1981-85	1986-89	
727	0 Ac.	0 Ac.	0 Ac.	0 Ac.	0 Ac.
730	0	0	0	0	0
735	0	0	0	159	159
738	42	48	307	161	558
Period Totals	42 Ac.	48 Ac.	307 Ac.	320 Ac.	717 Ac

Source: TSMRS Data Base Query, 1989

NOXIOUS WEEDS

Several species of noxious weeds have been spreading throughout the State of Idaho over the past few decades, causing a variety of concerns on both agricultural and forested lands. Resources on National Forest lands including range, wildlife habitat, sensitive plants, and recreation are being affected. Additionally, crop yields are being reduced, rangeland productivity affected, and wildlife habitat impacted on private lands throughout the state. The State of Idaho and its counties are increasing efforts to eradicate populations of noxious weeds. The State has enacted a law requiring landowners to control the spread of noxious weeds.

Over 21,000 acres of the Idaho Panhandle National Forests have been infested with weed pests in recent years. Four species of noxious weeds are considered to be established on National Forest lands with another nine species verified as new invaders. An additional 28 species have been identified as potential invaders to the Forest. These weed pests exist as a potential source of infesting other ownership lands as well as uninfested areas

within the Forest (FEIS Weed Pest Management, 1989)

Noxious weeds known to exist on the Bonners Ferry Ranger District include:
- spotted knapweed (Centaurea maculosa),
- common St. John's-wort (Hypericum perforatum),
- Canadian thistle (Cirsium arvense),
- meadow and orange hawkweed (Hieracium spp.),
- rush skeletonweed (Chondrilla juncea),
- and common tansy (tanacetum vulgare).

The most common locations include roadsides, powerline/gasline right-of-ways, and private land. Three noxious weed control projects are planned within or adjacent to the Decision Area on Road 211, Road 2517, and Meadow Creek Road 229; as specified in the Final Environmental Impact Statement for Weed Pest Management on the Idaho Panhandle National Forests.

A noxious weed survey was conducted in the fall of 1990 in the northern half of the Decision Area for the Hellroaring timber sales. Noxious weed species located included meadow hawkweed, spotted knapweed, Canadian thistle, and common tansy. The meadow hawkweed populations have the highest potential for a population explosion in the Hellroaring Creek drainages. The existing scattered populations were hand-pulled during the survey; these areas will be monitored for future infestations in subsequent years.

INTRODUCTION

The affected recreation area for West Moyie includes the Decision Area plus the Meadow Creek and Robinson Lake campgrounds and their immediate areas as shown on Recreation Opportunity Spectrum map. The campgrounds border the Decision Area and recreation activities commonly occur outside the immediate campground and within the West Moyie area.

This discussion will define the Recreation Opportunity Spectrum as identified on the map. The effect of Threatened and Endangered wildlife and the Forest Plan Management Areas for this area are explained. Current recreation activities, facilities, and unique features of the area are also explained.

The affected recreation environment falls primarily into four categories on the Recreation Opportunity Spectrum (ROS) (USDA Forest Service, 1986). Much of the unroaded portion of Decision Area is classified as Semi-Primitive Motorized while most of the roaded portion is classified as either Roaded Natural or Roaded Modified.

Recreation Opportunity Classes

The class definitions are:

Semi Primitive Motorized - natural environment, low concentration of users, evidence of other users present. Access by motorized equipment is allowed on trails.

Roaded Natural - natural appearing environment within roaded areas, moderate evidence of other users, resource management activities have generally occured in the past.

Roaded Modified - sub class of Roaded Natural for that part which has been heavily modified. Environment and user evidence is more like Rural except that the social setting is semi-primitive.

Rural - natural setting has been substantially modified and the user is very likely to encounter other users.

The Semi-Primitive Motorized areas are natural environments where concentration of users is low but there is evidence of other users. These Semi-Primitive Motorized areas currently provide recreation isolated from the sights and sounds of humans. They give visitors a backwoods experience characterized by isolation, tranquillity, self-reliance through outdoor skills, and closeness to nature. Most of the areas accessed by existing hiking trails are Semi-Primitive Motorized.

Areas classified as Roaded Natural are located primarily within the roaded portion of the Decision Area. These areas are predominately natural appearing with moderate evidences of the sights and sounds of humans which usually harmonize with the natural environment. Resource modification and utilization practices are evident but the natural environment still dominates. Users have an equal chance of finding other visitors or finding isolation.

Roaded Modified lands typically occur along less used forest roads. Land management activities, primarily logging, dominate the view. Roaded Modified is a heavily modified Roaded Natural sub class ranked between Roaded Natural and Rural.

A more developed Rural setting is found at Robinson Lake and Meadow Creek campgrounds. The natural setting has been substantially modified and the user is very likely to encounter other users.

The Decision Area is approximately 30 to 45 minutes by car from Bonners Ferry using the Highway 2 and Meadow Creek Road route or using Highway 95. National Forest lands within the Decision Area provide 6.85 miles of river frontage, and access to low elevation public lands via the Sidehill trail.

Threatened and Endangered Wildlife

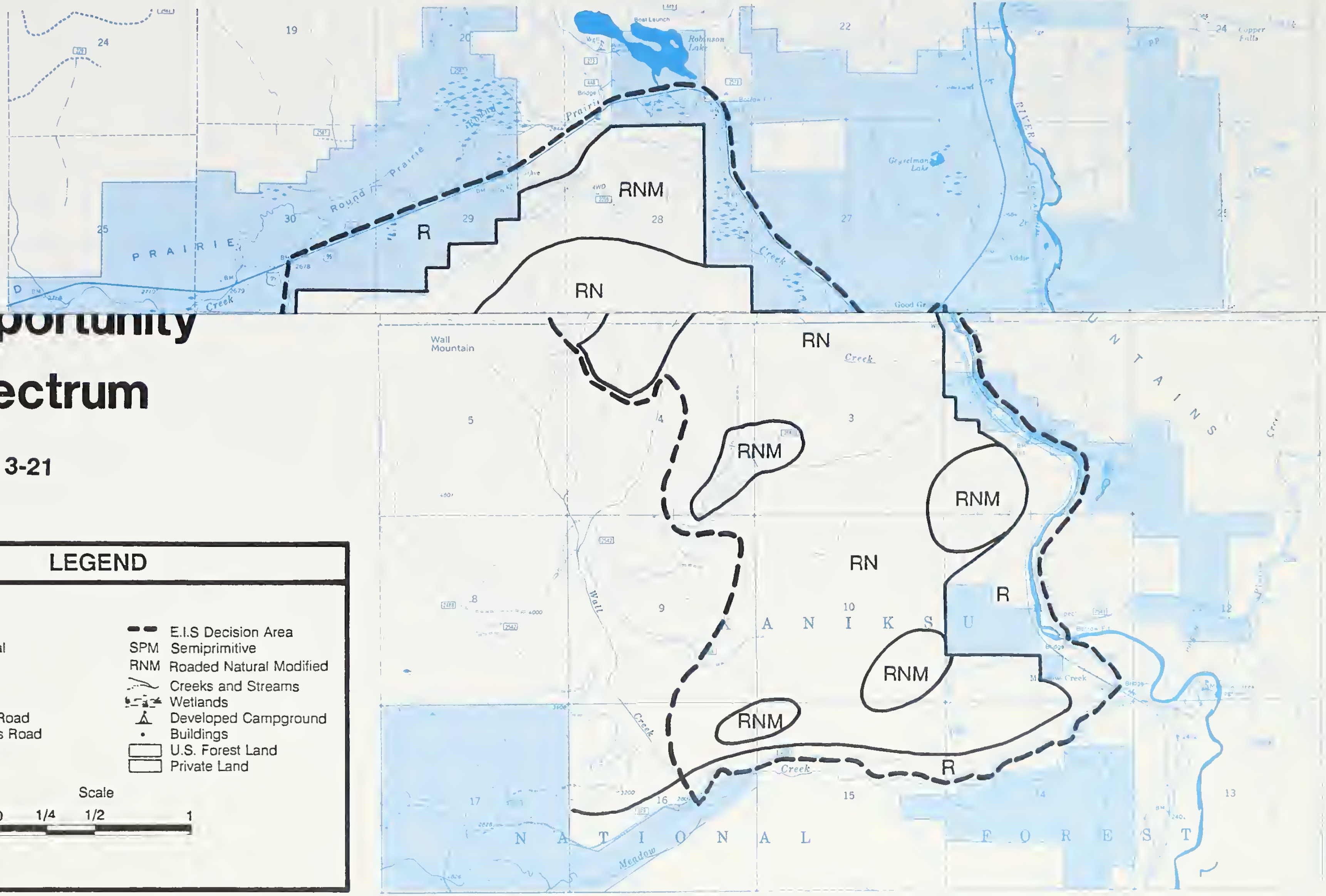
Because there are minimal conflicts with Threatened and Endangered wildlife species, the area offers unique recreation development and use opportunities compared to most of the Bonners Ferry Ranger District. There are no grizzly bear or caribou recovery units within the Decision Area.

Forest Plan Management Areas

The Forest Plan identifies four management areas within West Moyie - MA1, MA4, MA9, and MA16. (See page 3-4 for definitions of these areas.) One goal of MA1 is to provide opportunities for dispersed recreation. Within the MA1 allocation, the Forest Plan identifies management primarily for Roaded Modified and Roaded Natural ROS

Opportunity Spectrum

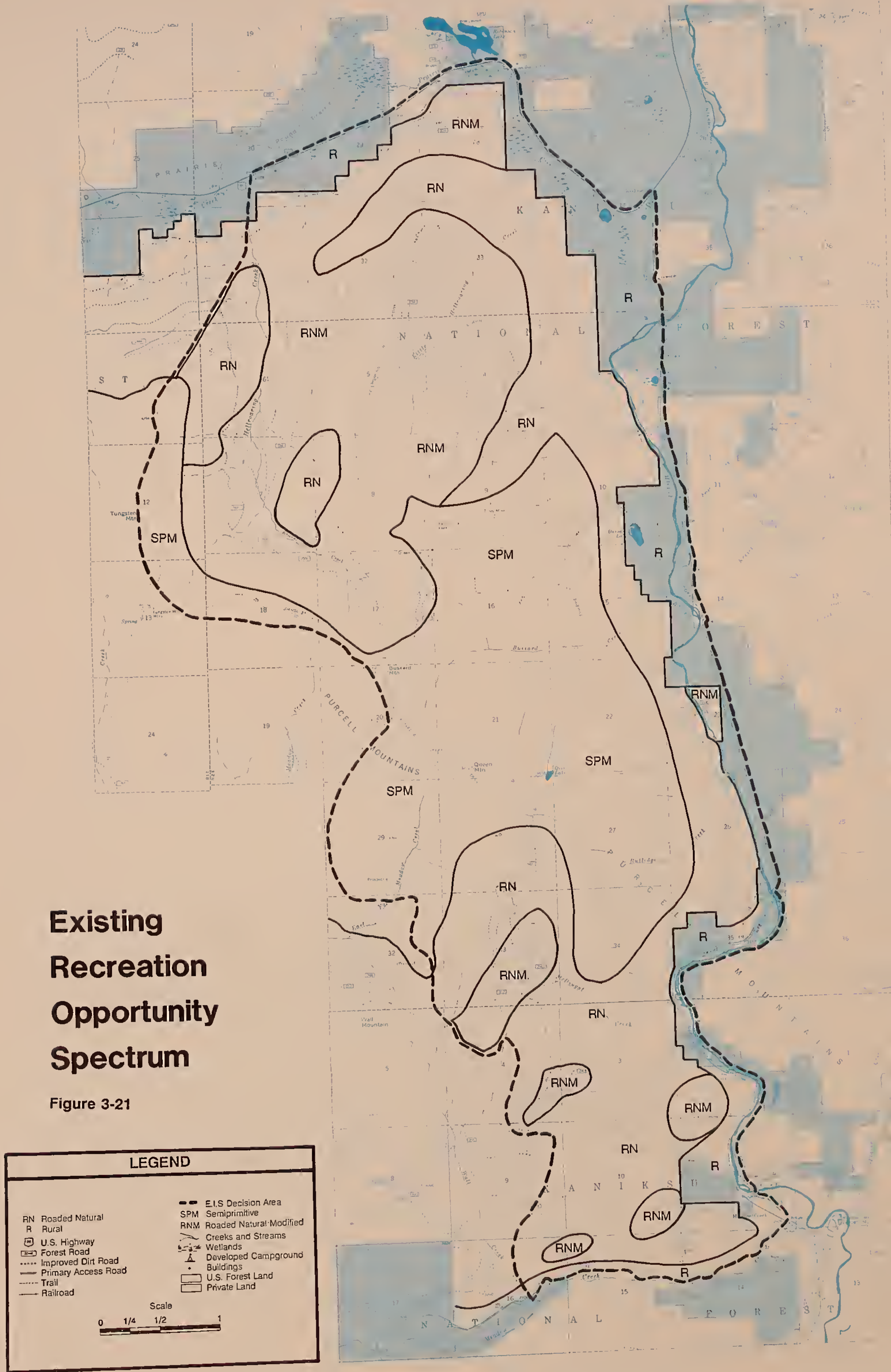
Figure 3-21



LEGEND

RN Roaded Natural
R Rural
U.S. Highway
Forest Road
Improved Dirt Road
Primary Access Road
Trail
Railroad
E.I.S Decision Area
SPM Semiprimitive
RNM Roaded Natural Modified
Creeks and Streams
Wetlands
Developed Campground
Buildings
U.S. Forest Land
Private Land

Scale
0 1/4 1/2 1



Existing Recreation Opportunity Spectrum

Figure 3-21

classes. Roaded Modified is found along less used forest roads. Management activities dominate the view. MA4 management goals are much the same as those for MA1 with an emphasis on management for big game winter range habitat. Within the MA9 allocation, the area is managed for Roaded Natural or Semi-Primitive Motorized or non-motorized ROS experiences.

Current Recreation Activities

The Decision Area supplies a variety of recreational opportunities. Hunting, fishing, and river rafting are some of the more frequent activities. The area is noted for elk, moose, and white-tailed and mule deer hunting. Hunters use both roads and trails.

Fishing on the Moyie River is good where there is public access to the pools in the river. Sinclair Lake has potential to become a high use fishing site since recent construction of a fishing dock and conversion of the lake fisheries from numerous small perch to annual stocking of catchable size trout. Current hunting and fishing use is in the moderate to high range.

The Forest Service Recreation Inventory Manual for trail system use defines Heavy Use as 500 travelers and/or pack stock per year. Medium Use as 100 to 500 travelers and/or pack stock per year. Light Use as less than 100 travelers and/or pack stock per year.

Hiking and horse riding on the six existing maintained trails varies from light to heavy. The lower trail elevations offer stands of mixed conifers; pure lodgepole pine; and stands of conifers mixed with quaking aspen, paper birch, and cottonwood. There are some one acre and smaller stands of pure aspen. Trails at higher elevations offer vistas from sidehill parks and ridges as well as subalpine forests. Horse/hiker use is highest along the Rutledge Trail to Queen Lake and Queen Mountain, and the Danquist Trail to Tungsten Mountain.

Firewood cutting and huckleberry picking are predominate recreation gathering activities. Firewood cutting is common along the Hellroaring road. Huckleberry picking does occur away from road or trail access. It is most common on the south end of the decision area. Compared to other areas on the district, this area receives low to moderate use for gathering activities.

Driving for pleasure, sometimes in combination with other recreational pursuits, is especially popular in the summer and fall. Visitors can make a loop trip using Highway 2 and Meadow Creek road to view the Moyie River along the east side of the decision area, and Highway 95 to view Tungsten Ridge and the west and northern flanks of the Decision Area. From Meadow Creek Road, the environment appears to be natural with little evidence of man's activities.

The two campgrounds within the affected environment have different amounts of use. Robinson Lake Campground and boat launch facilities are located along Highway 95, a major route to and from British Columbia, Canada. Visitation is moderate to high for both camping and day use. Meadow Creek campground is accessed by a gravelled county road approximately l0 miles from either U.S. Highway 2 or Highway 95. Use is low to moderate by campers and day use recreationists. The managed use period for both sites is May 20 through September 30.

Currently the West Moyie area is not managed for snow sports, such as cross country skiing, snowmobiling, or skating. Use of the area for snow sports has been predominately by local citizens and use is light. There have been minimal efforts to provide cross country skiing in the vicinity of Robinson Lake boat launch.

Other unmanaged but suitable recreation activities, with light use by local residents, include motorbike/ ATV riding and mountain bike riding.

One outfitter/guide currently offers recreation activities in the area. By Special Use Permit, the guide has renovated part of historic Snyder Guard Station to use as a base for sightseeing day rides on trails in the east half of the decision area. The operation currently results in light use for trail rides, but increasing use of the guard station for events, such as conventions and family gatherings.

Figure 3-22

RECREATIONAL TRAIL SYSTEM

Current Facilities and Unique Features

Maintained trails cover 36.5 miles in the decision area and offer varying recreation experiences. To date most trails in this network have been maintained to pack/saddle standard but have been kept open to all user groups. Trail #23 and segments of trails #32, 34, 152, and 225 are four wheel drive trails; however, they have not been maintained to four wheel drive standard. All other trails in the network are classified as "most difficult" pack stock standard generally due to grade (Trail Management Plan 1987 -1997).

The **Rutledge Creek Trail #152** takes the forest visitor from the valley bottom to Queen Lake and Queen Mountain, gaining almost 4000 feet elevation over 5.8 miles. An alternate trail access to the mid-point of the trail comes in from the Wall Creek area.

The **Sidehill Trail #415** covers 13 miles along the east side of the Decision Area. The trail currently offers seclusion from most development activities in the adjacent Moyie River Valley. Its main attributes are vegetative diversity along the trail and its role in connecting loop trails.

The **Snyder Trail #307** connects Snyder Guard Station and the Sidehill Trail. It is enjoyed primarily by horsemen since the cable used to cross the Moyie River is no longer functional.

The **Danquist Trail #225's** primary offering is a high ridge walking experience with numerous views in all directions. The trail accesses subalpine forests and rocky, occasionally clifty formations. Big game sightings are common along this trail.

Hellroaring Ridge Trail #34 is both a jeep road and foot trail. It accesses Queen Mine which has cultural resource values and also provides a ridge route until it disappears in a recent timber harvest unit.

The **Bussard Mountain Trail #32** starts in the valley near Bussard Lake and climbs through heavily forested areas and openings until it connects with Hellroaring Ridge Trail near Queen Mine. The trail offers spectacular views of the valley and the mountains east of the valley. Most of the trails were constructed and used prior to 1914 for fire protection when Snyder Guard Station (then the Snyder Ranger Station) and the Hellroaring Ranger Station were the work centers.

The Decision Area has 44.3 miles of roads. 16.9 miles are open yearlong for motorized recreation access. Highway 95 is on the northern boundary of the Decision Area. Meadow Creek Road (county road #34), on the east and south edges, is a well maintained gravel road administered by Boundary County. Most other roads in the West Moyie area located in Hellroaring, Little Hellroaring, and Wall Creek drainages have been developed for logging or mining access. The majority of Forest development roads are native material roads. Native surface and jeep roads, at higher elevations such as Bussard Mountain and Hellroaring Ridge, were built for mining activities and motorized access to lookouts.

Robinson Lake Campground and boat launch is on the northern end of the Decision Area. This fee campground can accommodate 100 persons at one time at the ten camping sites, a day use site, boat launching facilities and handicapped facilities. Fishing is a very popular activity at Robinson Lake.

Meadow Creek Campground is at the south end of West Moyie. This campground has 23 sites adjacent to the Moyie River. The remoteness and the mix of rural farmland and forested mountains are the primary attraction of this facility.

In addition to Robinson Lake, **Sinclair and Queen Lakes** have fisheries and scenic attributes. Access to Queen Lake is via a 1/2 mile trail. Access to Sinclair Lake is less than 1/4 mile of road.

Other notable features in the Decision Area are the **Bussard Mountain-Queen Mountain Ridge and Tungsten Ridge**. These rocky, often open ridges, dominate the eastern landscape from Highway 95 north of the junction of Highways 95 and 2 and are one of the recreation attractions for trails in the Decision Area.

The **Moyie River** is a major attraction for canoeing, rafting, and fishing as well as its scenic qualities. Private ownership limits public access. Through the Forest Service land exchange program,

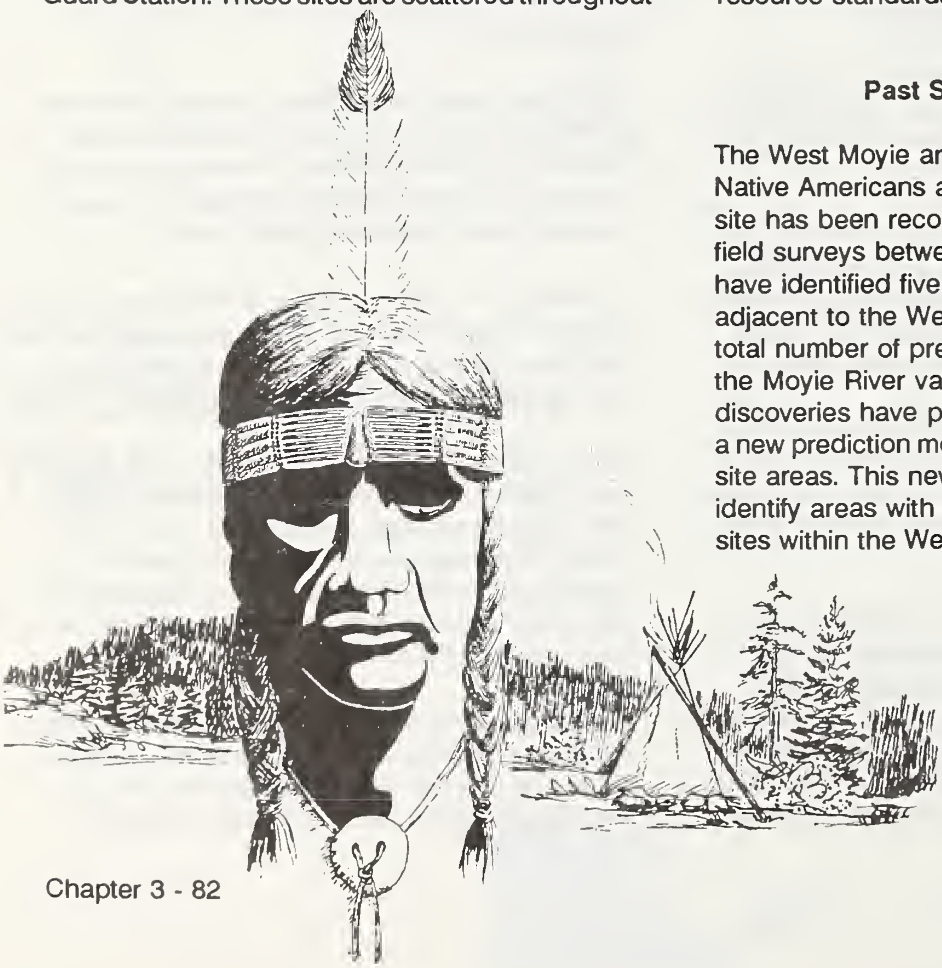
additional lands are being acquired along the river.

Snyder Guard Station (formerly Snyder Ranger Station), a turn-of-the-century facility, is listed on the National Register of Historic Places. Located on the Moyie River, many of the buildings are still standing and some have recently been restored. The station is currently under special use permit to a local outfitter and guide who has aided in restoration work.

CULTURAL RESOURCES AND SETTING IN THE WEST MOYIE AREA

Cultural resources are the remains of human occupation or activity in the form of artifacts, sites, structures, or other features that were of importance in human events, both historic and prehistoric. These resources document past human use of the forest. The record includes evidence of prehistoric activity, early routes of travel, settlement, railroad, mining and early Forest Service activity.

The entire 18,626 acre Decision Area has been included in Cultural Resource Inventories. Forty three cultural resources sites have been recorded. All but one of the sites are historic. They include trails, lookouts, homesteads, mining, logging, a grave, a road and a National Register Forest Service Guard Station. These sites are scattered throughout the Decision Area with some concentration toward the ridge tops and a higher concentration closer to the Moyie River Valley. The single prehistoric site is located along the river, just beyond the Decision Area.



Approximately 4200 acres in the Queen Mountain vicinity of the Decision Area were inventoried by an early Cultural Resource survey project. No sites were recorded in this acreage during that survey; some have been recorded by later projects. If the selected alternative includes proposed cutting units within this area, the district archeologist will evaluate each unit and conduct a field inspection if deemed necessary to maintain current cultural resource standards.

Past Settlement Patterns

The West Moyie area was most certainly used by Native Americans although only one prehistoric site has been recorded in the area. Additional field surveys between the Draft EIS and Final EIS have identified five additional prehistoric sites adjacent to the West Moyie Decision Area. The total number of prehistoric sites now identified in the Moyie River valley equals six. These new discoveries have provided information allowing for a new prediction model for identifying high potential site areas. This new information has been used to identify areas with high potential for prehistoric sites within the West Moyie Decision Area.

The Moyie Valley is a natural travel route with many opportunities for hunting, fishing and gathering. The area may not have been favored as a long term habitation area with the Kootenai Valley being so close, but most likely was used seasonally.

Historic use of the valley appears to date from the early 1800s when fur trappers first entered the region. No sites have been identified, although a trail up the west side of the river has been referred to as the "old trappers trail". This route may have been used during the "stampede" to the gold fields of British Columbia near Fort Steele in the 1860s. The main supply route ran from Walla Walla through Bonners Ferry and north. Some accounts name the Moyie Valley as a route. There probably were three routes north of Bonners Ferry, with the Moyie being one.

Mineral Interest in the Moyie Valley and adjacent mountains appears to have started in the 1880s-1890s. Many prospectors roamed the area staking placer and quartz claims. Only the Queen Mine and later the Tilley were ever developed to any degree and these only minimally. Other mines adjacent to the Decision Area were developed to a higher degree, but none ever became major producers.

Settlement really began around 1906 with homestead claims begining to be filed along the river's flood plain. The completion of the Spokane Railroad in 1906 may have been the attraction for the homesteaders. Communities began to develop along the railroad during its construction; with some persisting.

Meadow Creek, Addie and Sinclair were developed because the railroad made shipping of logs and lumber practical. Many homesteaders came into the area because supply points were now closer and there were means of employment off the homestead.

Twenty two homestead entries were made between 1906 and 1920 in Township 64 North, Range 2 East. Ten entries were made between 1914 and 1924 in Township 63. This may be related to community development and "booms". Meadow Creek reportedly "boomed" between 1916 and 1924 with a population around 200 (Post Office count which probably included loggers living in nearby camps).

The many small towns in the river valley have been abandoned for many years with only a single tavern currently located between Moyie Springs and Eastport. There are some year-round residents and a few recreation homes. There are no farms; and any ranches are operated as a hobby and not commercially.

CHAPTER 3 - AIR QUALITY

INTRODUCTION

"Atmospheric purity varies diurnally, from day to day, and year to year as a result of natural factors, primarily weather" (Cramer, 1974).

The air quality of the West Moyie area generally is considered as good to excellent through a majority of the year. Seasonal variations occur, resulting from weather conditions such as temperature inversions. Smoke and dust accumulations cause a seasonal deterioration of air quality. Smoke is generated from wildfires, prescribed burning, wood-burning stoves, and agricultural field-burning. Dust primarily results from vehicle traffic on gravel and native-surface roads or wind erosion on agricultural lands within Boundary County and as far away as the Palouse and Columbia Basin regions of Washington.

The average annual amount of smoke generated from forest sources, including wildfire and prescribed fire, has decreased from the early 1900s (Cramer, 1974). Smoke has been reduced in part because of improved techniques of controlling wildfire. The treatment of forest residues by prescription to spread the timing of smoke creation to periods when it is not prone to accumulate in the airshed is another reason why today's situation is better than the early 1900s.

Climatic Patterns and Burning Seasons

The climate of northern Idaho is characterized by dry summers and wet winters. Idaho's general climatic pattern is for April and May to be drier than June. June's spring moisture changes to summer drought in late June when the subtropical high pressure system along the west coast makes an abrupt shift to the north. Because of this, Idaho receives little precipitation in July, August, and early September.

By mid or late September, the winter climatic pattern begins to form. The subtropical high pressure system moves to the south and permits the prevailing westerly winds to become reestablished. This brings on a succession of high and low pressure system (Ross and Savage, 1967).

Rainfall from this weather pattern allows three general prescribed broadcast burning seasons. During these periods fuel conditions and weather patterns are conducive for site preparation and hazard reduction activities as illustrated below. Spring burning occurs in April, May, sometimes early June. Summer burning is completed in July and August. Conditions also may be favorable through parts of June and September. Fall burning occurs in late August, September and October. Residue piles are burned in the late fall from mid-October through November. Winds, atmospheric mixing of the air currents, and fuel conditions during these burning seasons are the key factors affecting air quality.

Burning Seasons

APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER
<-SPRING-> <---------- FALL ---------->
<------- SUMMER ------> <- PILE BURNING ->

Spring Season

During the spring months, weather conditions typically are favorable for dispersal of smoke. Unstable airmasses are most common in spring months (Cramer, 1974). Convective smoke columns rise to their greatest height through unstable air. Also, more wind is associated with unstable airmasses, thereby increasing the dispersion and dilution of smoke in the immediate atmosphere. Less smoke accumulates in the airshed to the point that regulatory measures do not need to be employed to maintain acceptable air quality.

Duff and rotted wood produce smoke because they burn slowly and inefficiently. If this material is omitted from the burn, more efficient combustion is likely (Cramer, 1974). Duff and rotted wood are generally too moist to ignite during the spring season. Since most of these materials fail to ignite, much less smoke is produced from a given fuel bed than if burned under the drier conditions of other seasons.

In the spring, harvest residues within units to be burned dry out faster than the fuels in the surrounding timber. Therefore, there is less risk of a fire burning outside the prescribed area. During spring burns on the Bonners Ferry Ranger District, escapes from prescribed fires into surrounding timber have been small, usually less than a half acre. Smoke from escaped burns therefore is very minor.

Competition for space in the airshed is low during the spring months. As discussed above, smoke disperses more rapidly from the airshed because of favorable weather conditions. Another important factor is that there is very little agricultural burning occurring to the south and west in the spring as typically occurs during the fall months.

Summer Season

As mentioned previously, a summer dry season commonly begins in June or July. This weather pattern provides hot, dry weather during which fires burn vigorously. The summer season is the wildfire season in this region. Large forest fires during the summer months often fill the airshed with smoke. If these fires occur during stagnant air conditions, smoke fills the airshed to the point that visibility is significantly reduced. Occasionally, safe travel and persons with breathing ailments also are affected. Because smoke from wildfires may exceed air quality standards, prescribed burning in the summer often is not allowed because of the additional smoke it would generate.

The set of conditions that will produce the least smoke (i.e. driest fuels, hottest fire, ... and shortest smoldering time) normally occurs during the summer months (Cramer, 1974). However, because of the hot, dry summers in Idaho, a much greater risk exists of the fire escaping from the prescribed burn. These escapes can be very large. Bonners Ferry Ranger District has experienced escapes exceeding 1000 acres. In themselves, these escapes create more smoke than what was created from burning the prescribed area.

Temperature inversions with warm air trapped under a layer of cooler air are commonplace, particularly on clear summer nights. Because of the inversions, smoke settles into the valleys at night. At the same time on the slopes above the temperature inversion, humidity may average only 50 to 60 percent (Finklin, 1983). This phenomena of the thermal belt above the inversion creates conditions for successful nighttime burning with less risk than daytime burns at those locations.

Fall Season

Fall weather is typified by extended high pressure systems which have become known as "Indian Summer". During these high pressure systems, little or no wind blows. This has been documented at the Priest River Experimental Forest where 24-hour average wind speeds are the lowest during autumn and winter (Finklin, 1983). Cramer (1974) also noted that autumns are generally characterized by stable airmasses. Temperature inversions are commonplace during early autumn nights (Finklin, 1983). Smoke can get trapped in the valley bottoms for several days during periods of inversions and stable weather conditions.

The least risky weather conditions for burning forest residues occurs during the stable weather conditions of the fall season. Until about 15 years ago, the fall was considered the optimal burning

season because of the normally stable weather conditions.

During fall burning, forest residues are somewhat wetter than during the summer months, causing them to burn cooler and to generate more smoke. Duff and rotten wood are usually dry enough to ignite in the fall. These fuels are prone to smoldering fires which creates more smoke than does an active, flaming burn.

Fuels outside the prescription area are often drier than those inside the prescription area because of the sheltering effect of a timber canopy. This condition makes fire escapes more likely. An escape will probably be larger than during spring burning, but smaller than what potentially may occur during the summer months. Smoke from these escapes is therefore potentially greater than in spring, but less than during the summer.

There is great competition for space in the airshed during the fall burning period. The fall season is the time when regulatory measures are most often implemented to stop igniting or to extinguish existing fires until the airshed is cleared. If the summer has had numerous wildfires, large areas of forest fires can still be pumping smoke into the air. In addition, high volumes of smoke are generated every fall during agricultural burning. Because agricultural burning consumes fine fuels that dry out faster than forest fuels, their burning windows usually open two to five days before the slash burning windows are open.

Another source of smoke in the airshed at this time of year is domestic fireplaces and woodstoves. Agricultural and domestic smoke is usually generated under the fall inversion, so that it cannot be lifted out to transport winds that more readily disperse smoke. All these sources can create a very smoky environment, particularly during periods of strong high pressure, when wind conditions are very stagnate.

The late fall from mid-October to November is the optimal season for burning forest residues in landings or dozer piles. Properly assembled, clean piles burn more efficiently than a broadcast burn because of better ventilation, the higher temperatures generated by a greater concentration of fuel, and minimum amounts of green or smoldering fuels (Cramer, 1974). Late fall is a season of considerable precipitation. Burning piles at a time that sends smoke into a precipitating raincloud quickly removes smoke from the air (Cramer, 1974). Moreover, during the late fall months, little competition for space in the airshed exists from wildfire or agricultural burning.

Airsheds

Dust and smoke generated locally also affects the air quality in northwestern Montana, southeastern British Columbia, and southern Alberta. Montana and the Canadian provinces are affected because the prevailing wind direction occurs from the southwest through a majority of the year.

The Bonners Ferry Ranger District lies adjacent to the Kootenai Airshed, which covers Lincoln, Sanders, and Flathead Counties in Montana. Montana has established ten airsheds throughout the state to monitor and implement a smoke management plan. The Kootenai Airshed is rated as a Class 2 airshed.

The Cabinet Wilderness, another important airshed in Montana, lies 35 miles southeast of the West Moyie study area. To maintain the existing high air quality standards of this designated area, the Cabinet Wilderness is classified as a Class 1 airshed.

Unlike Montana, Idaho has not formally designated classes of airsheds. Air quality is managed on a rough zone concept; for instance, Boundary County is included in the North Idaho Zone.

Regulatory Requirements

The Clean Air Act of 1963 is the primary legislative tool for improving and maintaining air quality in the United States. The act was amended in 1970 to require the Environmental Protection Agency (EPA) to identify pollutants that have adverse effects on public health and establish air quality standards for each pollutant. Each state was also required to develop an implementation plan to maintain air quality (Sandberg, et al, 1979).

The U.S. Forest Service is a party to the Montana Air Quality Agreement and has a Memorandum of Understanding with the State of Idaho. There are presently no agreements on air quality between the Canadian Provinces and the Forest Service.

Montana Air Quality Agreement

The objectives of the Montana Smoke Management Memorandum of Agreement of 1978 are:

1. To minimize or prevent the accumulation of smoke in Montana to such degree as is necessary to protect state and federal ambient air quality standards when prescribed burning is necessary for the conduct of accepted forest practices such as hazard reduction, regeneration and wildlife habitat improvement.
2. To develop a smoke management plan for reporting and coordinating burning operations on all forest and range lands in the state.
3. Guidelines in the plan will be based upon the principles of and technical information currently available on smoke dispersion and on state and federal air quality regulations.
4. At end of each burning year, evaluate the program, review agreement and improve smoke management plan where feasible.

To meet the above objectives, signatories of the Montana Smoke Management Memorandum of Agreement agree that:

1. Each member is responsible for proper smoke management in its area of operations.
2. Each organization will adhere to the restriction procedures of the airshed group which enable the monitoring unit to reduce burning, stop burning in specific areas or cease burning entirely when meteorological or existing air quality conditions so warrant.
3. The monitoring unit is responsible for the daily monitoring of meteorological data, air quality information and planned forestry burning. It is also responsible for notifying local airshed coordinators when acceptable limits of smoke accumulations are threatened or exceeded.
4. By virtue of membership, each signatory is granted an annual air quality permit. However, should a member organization fail to follow any procedures, requirements or restrictions issued under the plan, it will be considered grounds for revocation of the annual permit, and/or membership (Montana Smoke Management Memorandum of Agreement, 1988).

In practice, the Bonners Ferry District notifies the local airshed coordinator annually of all planned burning. Then, a day ahead of burning, the coordinator is notified that burning is planned. Prior to ignition, the burn boss determines if burning the unit is within the smoke management guidelines, before making a "GO" decision. If there is a restriction on burning, the restrictions are followed in accordance with direction from the local airshed coordinator.

Idaho Smoke Management Regulations

At the present time the Forest Service, through a Memorandum of Understanding (MOU) with the State of Idaho, agrees to comply with the State of Idaho Air Quality Implementation Plan. The basic agreement in the MOU is that the parties agree to develop and seek application of the best available air pollution control technology for activities and uses of forests and rangelands with intent to meet the Rules and Regulations for the Control of Air Pollution in Idaho and to protect air quality related values, including visibility (Memorandum of Understanding, 1988).

In accordance with this agreement, the Forest Service provides the Division of Environment with information concerning planned residue burning. If the State of Idaho requests the Forest Service to stop or limit residue burning, the appropriate action is taken.

CHAPTER 3 - GEOLOGY, SOIL, MINERALS

Geologic History of the Area

The majority of the West Moyie Decision Area is underlain by formations of the pre-Cambrian Belt Series which are composed primarily of metamorphosed sedimentary rocks, including argillites, siltites, and quartzites. The predominant bedrock is quartzitic siltite which is hard and resistant to weathering. Dikes and sills have invaded rocks of the Belt Series in many places. These intrusions are composed of medium to coarse grained quartz diorite and gabbros and range in thickness from 30 to 2,000 feet (Kirkham and Ellis, 1926).

Rocks of this type are very hard, extremely resistant to weathering and often form ridges and cliffs.

In recent geologic history, during the Pleistocene which began approximately 1,000,000 years ago, the entire Decision Area was covered by large continental ice sheets. This changed the local topography from rugged mountain peaks to a much smoother landscape with rounded peaks and ridges and created many hanging valleys. Repeated episodes of glaciation scoured preexisting soils and parent material from the land. In some areas underlying bedrock was exposed. On many areas great expanses of till were deposited in variable thickness and compositions.

These tills frequently form a dense subsoil which restricts water movement and root penetration. Natural slope failures are relatively rare in the Decision Area, but tills with water-restricting layers are sensitive to deep cuts. They can become unstable, resulting in an increase of cutbank sloughing and other slope failures. This is particularly true where roads enter draws to cross drainages. Cutbank sloughs make poor seedbeds and may pose problems for revegetation.

Approximately 7,000 years ago volcanic activity in the Cascade Range deposited a layer of ash averaging 1/2 to 1-1/2 foot thick over the Decision Area. This ash deposit forms the top layer of many soils in the area. The ash has a low bulk density, high nutrient content, high infiltration and water holding capacity, and is an excellent plant growth medium (Ford, 1985). Because of its surface position, it is very susceptible to compaction, displacement, and erosion, which can reduce long-term site productivity.

The geologic history of the area had a great influence on development of soil characteristics. The most recent period of glaciation ended approximately 10,000 to 12,000 years ago. The retreat of the glaciers marks the beginning of development for soils of the study area. Due to the relatively short period of time for development and the cool temperatures which inhibit chemical weathering of parent material, the soils in the Decision Area are considered young.

They exhibit little clay development or migration and do not have strongly differentiated soil horizons. Most soil nutrients are stored near the surface, in either organic material or volcanic ash layers. Organic material adds nitrogen and helps soil retain necessary nutrients. It also improves soil moisture retention and soil structure and protects the surface from erosion and rainfall impact. Most soils in the area have a relatively thin organic layer. Removal or compaction of nutrient-bearing ash and organic surface layers can reduce site productivity and increase surface erosion.

Current Analysis

Gary Ford, IPNF soil scientist, prepared the soil survey (land system inventory) used for this EIS. It is based upon air photo interpretation, study of geologic and topograghic maps and field work in the area. Since the soil survey was designed for planning purposes, the map units contain a number of soils rather than individual soils. The differentiating criteria for the map units include geology, elevation and vegetation, slope gradient, degree of landform weathering, dissections, position on landscape, relief, rock outcrop, and slope shape. The major soils, as well as the minor similar and dissimilar soils in each map unit, are identified and described in the Soil Survey of Bonners Ferry Ranger District (Ford, 1985).

There are 30 map units within the watersheds analyzed for the Decision Area. Map units 221, 260, and 263 account for 43 percent of the total acres in the Decision Area. These units contain young soils which formed in loess influenced by volcanic ash which overlies the glacial till that originated from metasedimentary rocks. Slopes are gentle (0 to 35 percent), but special management may be required to overcome limitations due to sensitive ash and dense till layers. Map units 260 and 263 occur at low to mid-elvations and have high timber productivity; 263 is dissected. Map unit 221 occurs at high elvations and has low to moderate timber productivity.

Twelve of the map units are considered to have moderate to high potential for mass failure and erosion, and sensitivity to mechanical activities (refer to the following Sensitive Landform Table). They account for 7,730 acres, approximately 31 percent of the total area analyzed by watershed.

The effects of forest management on long-term soil productivity are being researched throughout the Inland Northwest. Effects of equipment on sensitive or moist soils and the potential for soil displacement or erosion are the primary concerns under investigation.

Minerals

This area has always had mineral exploration. Township 64 currently has 35 claims, the remaining townships have no mineral entry claims. The townships that presently do not have claims have had numerous claims in the past.

The bedrock geology of the resource area is Precambrian Prichard Formation intruded by metadiorite sills called Purcell Sills. For the small older mines such as the Tilley and the Queen, the ore occurred along the contact of the sills with the Prichard Formation. More recently the Prichard has been the exploration target for stratiform massive sulphide deposits (Pb {lead}, Zn {zinc}, Cu {copper}, with associated Ag {silver}, and Au {gold}). To date no ore has been found. The mineral potential maps for the Forest Plan show this area to have a moderate potential for the occurrence of mineral deposits.

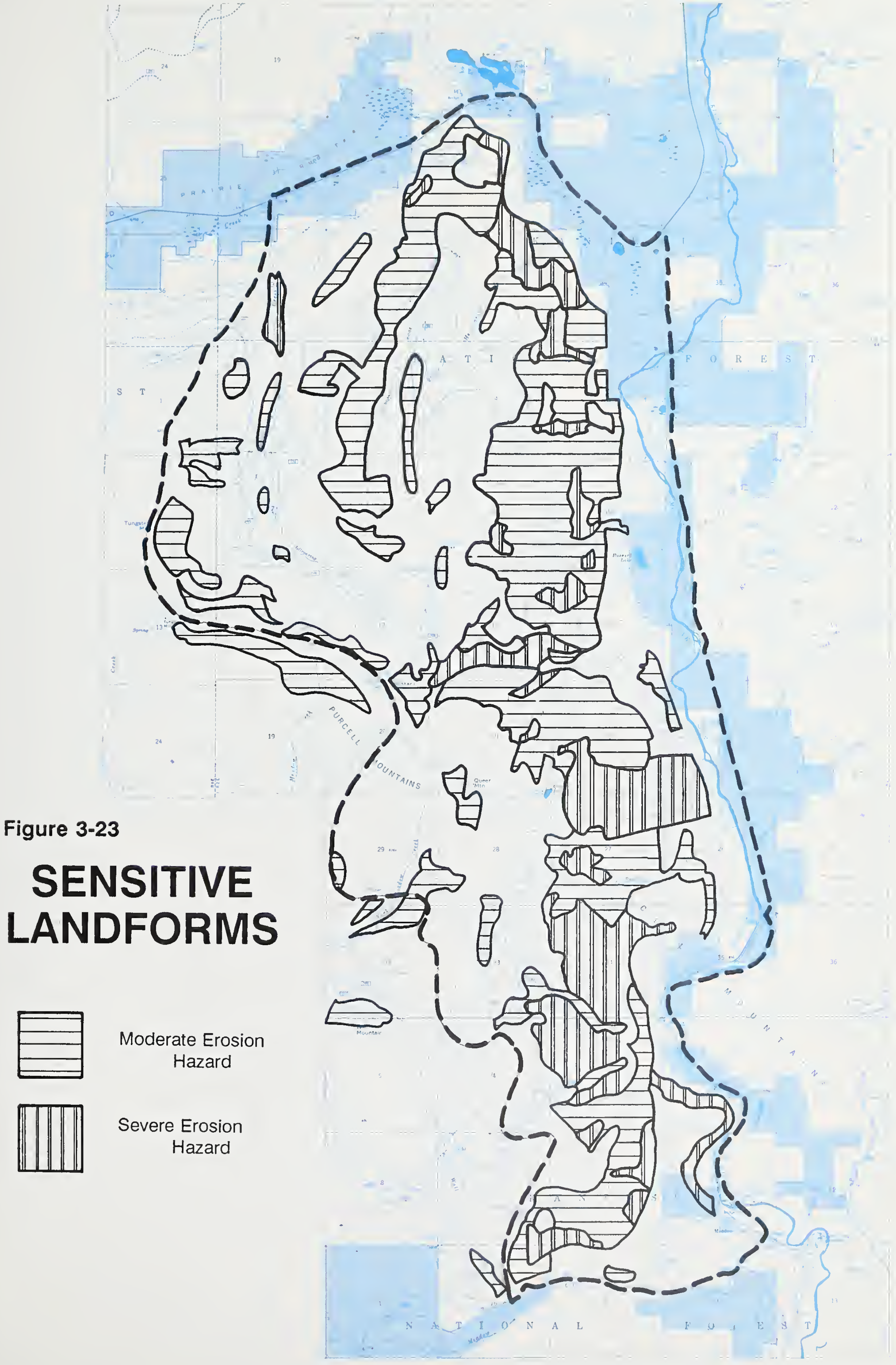
In addition, there may be some placer gold along the Moyie River as there has been minimal placer mining in the past along the river.

TABLE 3-14
Sensitive Landforms

Map Unit	Description	Acres	% of Watersheds	Hazard
180	Mountain sideslopes dissected by avalanche chutes	465	1.86	Severe
213	High elevation glaciated sideslopes, 35-55% slopes, open forest	235	0.94	Moderate
222	High elevation glaciated sideslopes, 35-55% slopes, closed canopy	351	1.41	Moderate
232	High elevation glaciated sideslopes, dissected 35-55% slopes	65	0.26	Moderate
261	Glaciated sideslopes, 35-55% slopes, closed canopy	2,643	10.59	Moderate
262	Glaciated sideslopes, 55-80% slopes, closed canopy	270	1.08	Severe
264	Glaciated sideslopes, dissected 35-55% slopes	1,386	5.56	Moderate
265	Glaciated sideslopes, dissected 55-80% slopes	881	3.53	Severe
271	Glaciated sideslopes, 35-55% slopes, dry aspect	673	2.70	Moderate
272	Glaciated sideslopes, 55-80% slopes, dry aspect	526	2.11	Severe
316	Glaciated sideslopes, 35-55% slopes, outcrop-forest complex, granitic bedrock	208	0.83	Moderate
361	Glaciated sideslopes, 35-55% slopes, closed canopy, granitic bedrock	27	0.11	Moderate
	TOTALS	7,730	30.98%	

Figure 3-23

SENSITIVE LANDFORMS



CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

ENVIRONMENTAL CONSEQUENCES

This chapter discloses the environmental consequences of implementing the alternatives. The Chapter 3 description of the existing condition provides the baseline for describing these consequences. A summary-style comparison of the alternatives is presented in Chapter 2.

Chapter 4 focuses on the more significant effects. Other consequences are described briefly. These effects are anticipated to begin as the activities are implemented between 1993 and 1996. This chapter also discusses the significant cumulative effects of the actions of the alternatives combined with past actions and reasonably foreseeable future actions. Forest Plan amendments that may be necessary to implement alternatives are described in the discussion of alternatives by resource.

All action alternatives are varying intensities of timber harvest and road construction. Therefore, the environmental effects of alternative vary considerably in degree, but not in kind. The level of detail for each resource analysis depends upon the character of that resource, the level of information available, and the scale of analysis most informative or relevant for the affected resource. Additional detail can be obtained by referring to the large supplemental maps and appendices.

Many of the effects discussed in this chapter are complex and not easily quantified. In regard to this, it should be kept in mind that many of the values presented are modeled predictions of the effects and the actual effects may not occur exactly to the degree presented. More important than the exact effects is the comparison of change between alternatives and present condition as determined by these models.

Changes Between The Draft EIS and Final EIS

In response to public comment on the Draft EIS (DEIS) many additions, corrections and clarifications were made in the preparation of the Final EIS (FEIS). The following information summarizes many of the changes which were made to better describe the Environmental Consequences of implementing any of the proposed alternatives.

The most significant change that occurred was the analysis of two new alternatives. The process of developing these additional alternatives (Alternatives EH and K), and the significant features describing the activities they propose, are explained in Chapter 2.

Where applicable, a discussion of the different silvicultural prescriptions and their effects were added to the resources represented in this chapter. Also included were discussions of other model variables, such as road densities, when these variables were more influential than harvesting methods in determining the outputs of the models that were used. For example, pine marten habitat values and elk habitat effectiveness are also closely tied to road densities as well as harvest method.

Changes by Section:

Roadless Character

One respondent to the DEIS requested that we address the cumulative effects of the proposed action and alternatives on the district wide roadless resource. This has been added to the roadless character cumulative effects analysis, assuming full implementation of the Forest Plan first decade roadless area timber harvest.

Water Quality

Based on comments received in response to the DEIS, the section on water quality has been rewritten to address how the proposed action and alternatives would affect the beneficial downstream water uses. Additional field verification of stream channel conditions was done, and the findings of these trips are included as well as the predictions of how the proposed action and alternatives would affect the condition of these channels. The descriptions of the existing conditions of the sub-drainages and the Moyie River itself were updated and corrected to reflect the IPNF's forest hydrologist and fisheries biologist interpretation of available data.

Effects of the alternatives on fisheries habitat has been included. This was included in response to comments that fisheries was never really consid-

ered. This section also now identifies the fisheries Management Indicator species.

Visual Quality

Clearcutting was raised as an issue by several respondents to the DEIS, these respondents found the appearance of clearcuts distasteful. In response to this, the effects of clearcutting as apposed to other harvest methods has been added to the visual quality section, as well as other resources that could be impacted by this harvest method.

Wildlife

Goshawk

The Decision Area was reviewed for potential goshawk habitat in response to input to the DEIS. Stands that have high feeding value and nesting value were mapped, these values were based on the Region One Habitat Suitability Index (HSI) model for goshawk. This mapping supported the findings of the model interpretation that the habitat distribution was very good in one goshawk analysis unit (unit 2). There is currently one goshawk analysis unit within the Decision Area that contains suitable feeding and nesting habitat to support one pair of goshawk, not two pair as stated in the DEIS.

The data used in the HSI model was also reviewed. Errors were found in the calculations for some forms of timber harvest, the result was that now one more alternative (Alt D) meets the HSI values needed to maintain suitable habitat for a pair of nesting goshawks in analysis unit 2.

In addition, the HSI model was calculated for the no action alternative assuming that a mountain pine beetle outbreak would occur as predicted by the regional entomologist. The results of this modeling are included in Chapters 2 and 4.

Pine Marten

Based on comments to the DEIS that the Decision Area is an isolated island, and that no interchange of marten with adjacent populations is possible, travel corridors for pine marten as well as other wildlife species were analyzed. This is presented under a section on biodiversity included in the section on vegetation.

Elk

Based on comments received to the DEIS, there have been several factual corrections made to the section on elk. To demonstrate that the model was correctly applied, elk habitat effectiveness for all time periods during the ten year activity period are displayed for each alternative. In addition, the discussion on the North Idaho Elk Habitat Guidelines model used to predict the elk habitat effectiveness for each alternative was expanded. A discussion on roads and their impact to elk was included. Also included was a discussion on how the model uses this information in predicting the elk habitat effectiveness. The model predictions for the alternative that contains helicopter yarding (alt J2H) was corrected to reflect a more accurate estimate of the time needed to complete the helicopter operations, resulting in an increase in the elk habitat effectiveness for this alternative.

White-tailed deer winter range

A discussion on roads and their effects to white-tailed deer in winter range were added based on the comments of one respondent to the DEIS.

Boreal Owl

Additional consultation with a leading expert on boreal owl habitat needs was conducted to identify harvesting techniques that would not cause a reduction in available habitat within the Decision Area.

Biodiversity and Vegetation

Biodiversity was added to the section on vegetation. The following items were introduced or the discussions were expanded and the effects were displayed:

Vegetative Diversity and Habitat Types
Forest Succession
Edge Effect
Old Growth
Fragmentation and Biological Corridors
Riparian Areas
Special or Unique Environments
Threatened, Endangered, and Sensitive Plant Species
Large Standing and Down Woody Material
Soil

ROADLESS EFFECTS

Changes between the Draft and Final EIS

ROADLESS AREA CUMULATIVE EFFECTS

Roadless areas are clearly an important part of the many resources on the Idaho Panhandle National Forests. Five letters received during the Draft EIS public comment period expressed roadless area concerns. These areas are valued because they are characterized by remoteness and limited vehicular access.

Roadless designation provides for recreation experiences and development in between wilderness and fully developed. Such areas provide a variety of recreation experiences, "quality hunt" areas, low access fisheries, and wildlife security. Mechanized uses not allowed in wilderness can occur on Roadless lands. These areas provide some flexibility for future planning and decisions. These areas will remain available for mineral exploration and development.

Some of the public comment on the Draft EIS opposed entry into the Hellroaring Roadless Area. The remainder of the respondents asked for a more complete analysis and disclosure of the effects of entry, including the cumulative effect on the Roadless area resource across the Idaho Panhandle National Forests. The cumulative effects during the first decade of Forest Plan implementation is discussed below.

IDAHO PANHANDLE FOREST-WIDE ROADLESS AREA EFFECTS

The Idaho Panhandle Forest Plan (Forest Plan) comprises the sideboards within which project planning and activities take place. The Forest Plan EIS contains a cumulative effects analysis of the anticipated overall forest management program, including the effect on Forest-wide roadless values. It further specifies under the "Desired Future Condition of the Forest" that "Approximately 146,600 acres of the roadless resource is proposed for wilderness (in addition to 9,440 acres of existing wilderness in Washington state), while an additional 226,500 acres is designated for semi-primitive recreation (some timber harvesting will be permitted on 111,800 acres). The roadless resource will decrease as roadless areas are developed through the timber management program." (Forest Plan page II-22)

As a project-specific analysis, it is not the purpose of the West Moyie EIS to reexamine the basic land use allocations made through the forest planning process nor to propose broad changes in the land use allocations for the Forest's roadless land resource. However, project level planning will refine and verify these allocations for reasonableness to on the ground situations.

When the Idaho Panhandle National Forest Plan was completed in 1987, the Forests' total land base was 2,487,477 acres. Approximately 34 percent (858,380 acres) was identified as Roadless areas. These lands are defined as areas of 5,000 acres or greater in size or any acreage if contiguous to wilderness. Forest level planning evaluated physical and biological features, historic uses, potential uses, concerns people expressed about management of specific areas, and wilderness attributes. "Roadless areas will be managed based on the direction and goals established for the respective management area within which they are located," Forest Plan page II-4.

The land management alternatives considered in the Forest Plan Final EIS analyzed a range from zero acres of Roadless area lands (Alternative 2) to a high of 858,000 acres in Roadless land management (Alternative 3). The Forest Plan recommended 18 percent of the Roadless lands (156,100 acres) for wilderness designation in the Record of Decision. Final decisions on wilderness designation have been reserved by Congress to itself.

The Forest Plan Record of Decision placed about 68 percent of the inventoried roadless area in management areas which allow future roading. Approximately one-third of this activity will occur over the next 10 to 15 years on roughly 190,000 acres (22 percent) of the roadless lands as the Forest Plan is implemented. Roughly 137,000 acres (16 percent) will remain roadless, about

60,000 acres (7 percent) will be in management areas which do not necessitate road construction. It is estimated that about 600,000 acres will remain undeveloped in the next 10 to 12 years. (page 20-21 ROD)

This EIS tiers to the Forest Plan EIS which can be reviewed for additional information, including the economic effects of management within roadless areas. Briefly summarized, the Forest-wide cumulative effects of the management allocations for the Roadless area lands are:

1. *Non-development is important in the maintenance of old-growth timber and its associated wildlife.*
2. *Non-development preserves natural appearing landscapes.*
3. *Non-development adds to the risk of more intensive wildfires by the increased buildup of fuels. Techniques to manage fuels in roadless conditions are not well developed. However, access to areas tends to increase the risk of human-caused ignition - a leading cause of wildfires.*
4. *Non-development limits minerals exploration and development.*
5. *In most Roadless area situations, control of insects, diseases, and wildfire will be more difficult and costly. In some cases, such as insect and disease problems, nature will continue its cycle and only the area itself is impacted. In other situations it can cause a buildup which spreads to other areas.*

Table 4-1

FOREST-WIDE ROADLESS AREA MANAGEMENT

Forest Plan Management	Acres	% Roadless Inventory
<u>1987 Roadless Area Inventory</u>	858,380	
MA's allow future roading	583,600	68
Remain roadless	137,000	16
MA's not necessitating Rd Const	60,000	7
<u>1ST Decade Implementation</u>		
Developed Roadless Inventory	190,000	22
Undeveloped Roadless Inventory	600,000	70

The following table summarizes the potential wilderness acres that would be remaining after the first decade of full implementation of the Forest Plan. The planning decade runs from 1987 through 1997.

Assuming full implementation of the Bonners Ferry Ranger District portion of the Plan, more than 81,000 acres would remain undeveloped. Areas would need to meet the minimum requirements for Wilderness designation for Congress to consider them for inclusion in the National Wilderness Preservation System.

Table 4-2

ROADLESS AREAS
(Thousands of Acres)

BFRD equals the amount on the Bonners Ferry Ranger District
TOTAL equals the amount within the Specified Roadless Area
BFRD 1st DECADE equals the amount remaining after 1st decade of implementation

ROADLESS AREA	TOTAL 1987	BFRD 1987	BFRD 1st DECADE
1-153 Continental Mtn	6.8	3.7	0
1-154 Saddle Mtn	8.6	8.6	0
1-125 Selkirk *	99.6	81.2*	42.8
1-128 Hellroaring #	8.8	8.8#	0
1-663 Northwest Peaks	13.6	5.7	5.7
1-661 Buckhorn Ridge	22.0	9.6	8.6
1-157 Katka Peak	12.4	12.4	10.0
1-173 Mt. Willard - Lake Estelle	52.8	24.4	14.4
1-127 White Mtn.	7.8	4.3	0
TOTAL ROADLESS AREA ON BONNERS FERRY RANGER DISTRICT		134.3	81.5

* Acreage has been reduced from the 1987 inventory figures to adjust for lands affected by the 1990 Trout-Fisher Timber Sale.
# Acreage has been reduced from the 1987 inventory figures to adjust for lands affect by the Hellroaring, Upper Hellroaring, and Little Hellroaring Timber Sales and four sales of less than 35 acres each.

BONNERS FERRY RANGER DISTRICT CUMULATIVE ROADLESS EFFECTS

The 1987 Roadless Area Inventory identified approximately 139,600 acres in nine areas on the Bonners Ferry Ranger District. Assuming that the Forest Plan is fully implemented in the first decade, roughly 44,300 acres would be developed. Non-developed Roadless area remaining at the end of the first decade would be about 95,300 acres. The Selkirk Crest Roadless area includes 26,658 acres which has been recommended for Wilderness.

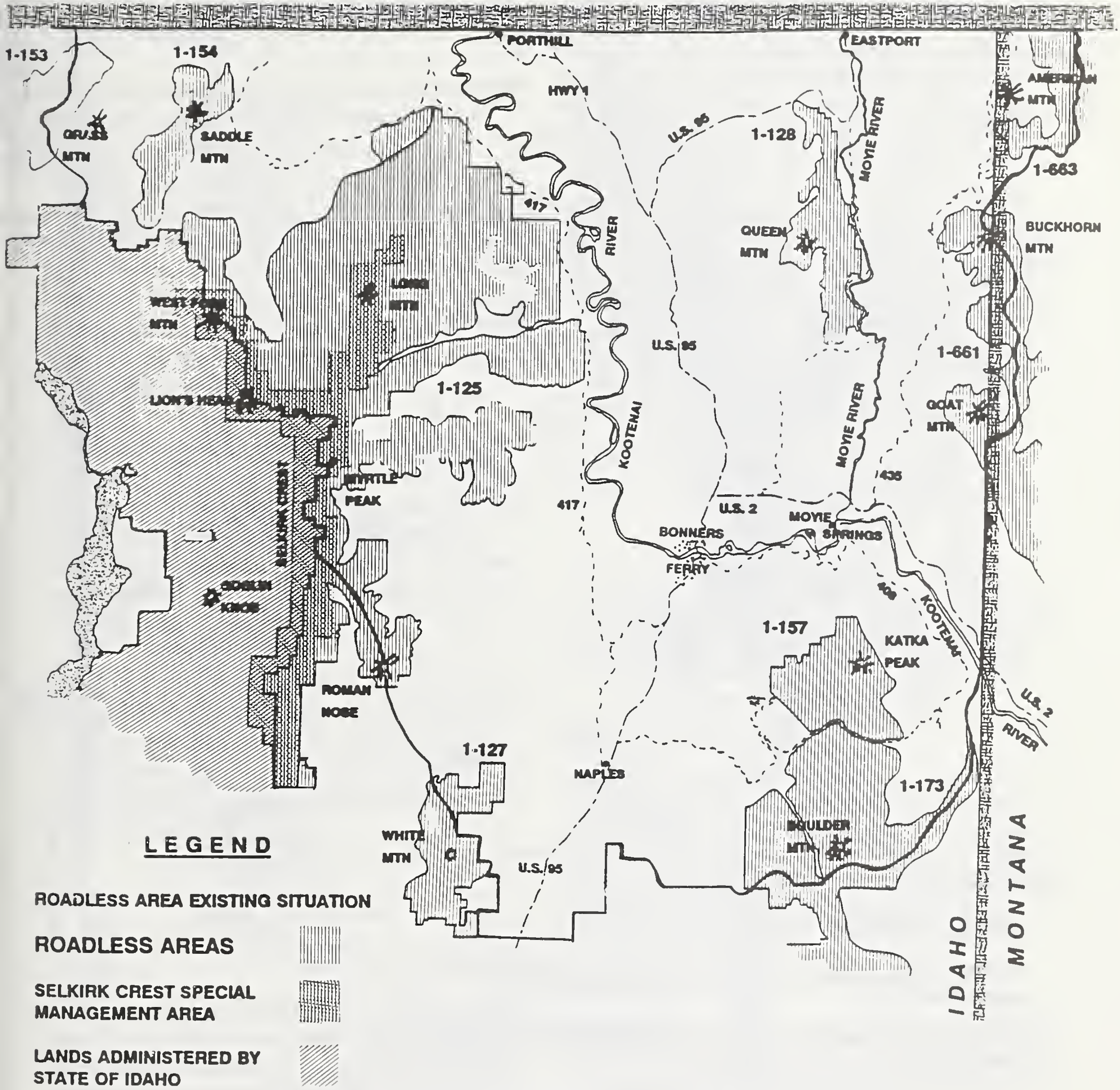
Development would take place in each area on the District with the exception of the Northwest Peaks Roadless Area number 1-663 which is administered in part by the Kootenai National Forest. Since completion of the Forest Plan roughly 2,400 acres have been reduced from the Selkirk Roadless Area Number 1-125 by the Trout-Fisher Timber Sale and about 2,900 acres have been developed in the Hellroaring Roadless Area Number 1-128 by the Hellroaring, Little Hellroaring, Upper Hellroaring timber sales and four sales of less than 35 acres each in size.

The management activities which have taken place between 1987 and now have been consistent with the Forest Plan direction for these Roadless Areas. Development has occured on approximately 3.8 percent of the roadless inventory on the District. This represents roughly 0.9 percent of the total Roadless Area inventory which has been identified for future roading on the IPNF.

The District-wide effects of developing the Roadless areas as outlined in the Forest Plan would be similar to those shown under the Forest-wide discussion. Because the nine Roadless areas are located throughout the Bonners Ferry Ranger District, the impacts would not be confined to a single zone or belt of land. The characteristics and natural integrity of these lands vary from the high elevation granite peaks of the Selkirk Crest to the lower elevation lands closer to existing developments such as White Mountain near McArthur Lake.

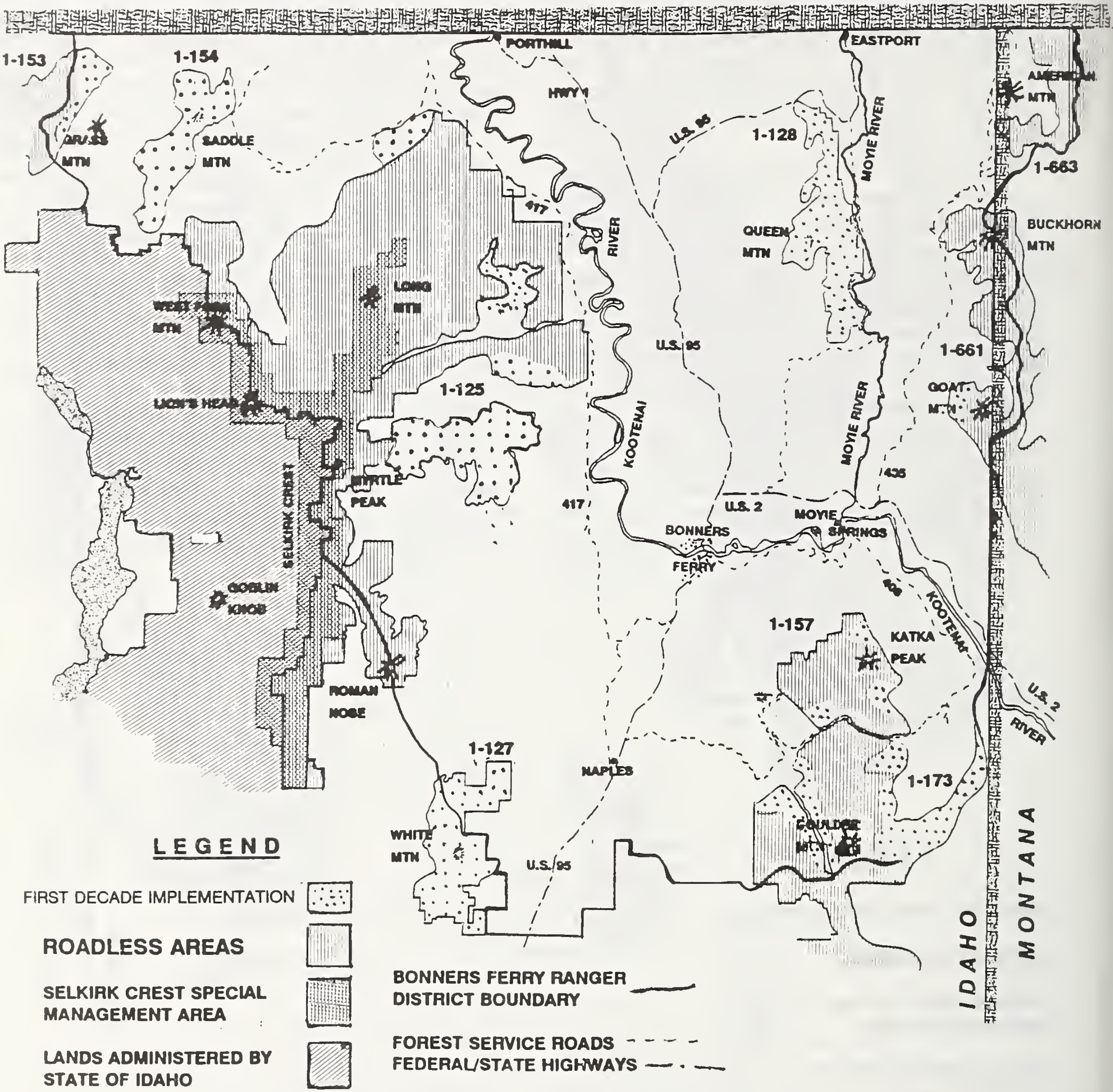
When projects are identified for implementation in each Roadless area, a site-specific environmental analysis will be done.

The following map shows the current Roadless Areas on the Bonners Ferry Ranger District. Maps showing the particular effects on the Hellroaring Roadless Area of each action alternative are shown on following pages of this section.



EXISTING DISTRICT-WIDE ROADLESS AREA MAP
FIGURE 4-1

This map shows the District-wide effects assuming that the Forest Plan is fully implemented in the first decade. As site-specific environmental analysis is completed for development projects, the boundaries or exact amounts of development may change.



FIRST DECADE FOREST PLAN IMPLEMENTATION MAP
FIGURE 4-2

HELLROARING ROADLESS AREA CUMULATIVE ROADLESS EFFECTS

Introduction to the Roadless Area Effects

The current condition of the Hellroaring Roadless Area is discussed in Chapter 3, see figure 3-4 page 3-11. The construction of roads and the harvest of trees has an irreversible and irretrievable impact on roadless values. These activities, by their ground and vegetative disturbance, have a direct effect on the physical and biological attributes of an area. Indirectly, the character is changed because the sights and sounds of human activities are more apparent. Increased access also tends to lower the wild character.

These effects make it unlikely that Congress will give further consideration to the developed portion for inclusion into the National Wilderness Preservation System. If less than 5,000 acres remain undeveloped, the entire remaining area may also be disqualified from further wilderness consideration.

The effects of various alternatives were determined by plotting road construction and timber harvest on a roadless area map. Disturbance was measured by the area disturbed (acres harvested, miles of road). A qualitative description of other effects is also included.

Effects Common to All Alternatives

The proposed construction of a new gas transmission line adjacent to the existing Pacific Gas Transmission Company's gas line that follows the Moyie River is a reasonably foreseeable future action. The effect of this activity would be noise disturbance from points along the east side of the roadless area and visual disturbance from vantage points along trails and Queen Mountain.

Effects Common to All Action Alternatives

Other Reasonably Foreseeable Actions

In addition to the proposed action, reasonably foreseeable activities which are common to all alternatives include salvage harvest, firewood cutting, and continued limited mining exploration. All of these activities are projected to occur from existing roads. Their effects would normally be incidental compared with any of the alternatives. The most noticeable effects would be noise disturbance and minor visual changes. Since the trail between Queen Mountain and Bussard Peak follows the road in some places, mining activities using this road could have significant effects. However; to date, past mining activities have been very limited in scope and duration. This is not expected to change.

Effects Common to Alternatives B2, D, H, I, J1, J2, J2H, and K

All of these alternatives propose some harvest and road building within the roadless area. These are irreversible and irretrievable impacts. Alternatives vary as to the scope and location of these impacts.

Natural Integrity

Both harvesting trees and constructing roads affect natural integrity. Roads cause increased erosion, either from the exposed surfaces or by concentrating flows of water in ditches. Ditches also can increase the efficiency of sediment delivery if not directed away from direct entry into live streams. Roads can also affect the downward flow of subsurface water, redirecting it and concentrating it in ditches.

Harvesting trees affects natural integrity. Clearcutting does not mimic wildfire exactly; wildfires often leave many trees standing and the ground is not disturbed through road construction or soil compaction from tractor skidding. Local monitoring indicates tractor skidding can significantly affect potential site productivity through soil compaction and soil movement.

Road construction is also necessary for seed tree, shelterwood, or selection harvest; it could also cause many of the same impacts. However, these harvest systems reduce the impact to the microclimate near the ground. This reduction increases as more cover is retained. Systems which leave standing trees can also significantly reduce visual impacts. This is especially true of long-term shelterwoods, thinning, and uneven-aged management.

The next section discusses the effects, by alternative, on the following roadless/wilderness values: primitive recreation opportunities, solitude, natural integrity, apparent naturalness, wilderness manageability, and unique features. Other wilderness/ roadless values such as wildlife are discussed in other sections. Please see Table of Contents for the location of these discussions.

ROADLESS EFFECTS BY ALTERNATIVE

ALTERNATIVE A

Alternative A would maintain the current condition of the roadless resource as shown on map Figure 3-4, page 3-11. There would be no direct, indirect, or adverse cumulative effects on the roadless resource. The opportunity for Congress to consider the entire area for wilderness inclusion into the National Wilderness Preservation System would be retained.

The current values for primitive recreation opportunity, solitude, natural integrity, apparent naturalness, unique values would remain unchanged.

Primitive Recreation/Solitude

The positive effects are:

(a) A trail system which offers about 26 miles of essentially undisturbed experience (semiprimitive recreation opportunity level).
(b) A landscape undisturbed by the sounds of these activities.

Apparent Naturalness/Natural Integrity

(a) A landscape visually undisturbed by roads and timber harvest. Views from the Moyie River would be maintained at a natural appearing level.
(b) Maintenance of pristine water quality for five watersheds which feed into the Moyie River--a river once studied for recreation river status.
(c) Maintenance of high quality wildlife security habitat. Habitat quality for all management indicator species is maintained at its highest level in this alternative.
(d) Not developing this area would please some local residents and would contribute to a cumulative sense of retention of the wild character of northern Idaho. This relative lack of development is certainly a contributor to attracting tourists which, in turn, contributes to the local economy.

Unique Values The unique value of being roadless is preserved. The values associated with Queen Lake are undisturbed.

Wilderness Manageability This boundary would be relatively convenient to identify and manage.

ALTERNATIVE B2

Alternative B2 would harvest approximately 1,065 acres and construct about 13 miles of road in the north, west, and south portions of the roadless area. Only several sections near Queen Mountain would remain undeveloped.

Approximately 2,600 acres would remain roadless after implementing this alternative. Thus, the option for Congress to consider this area for the National Wilderness Preservation System would be foregone. The unique value of this area as undeveloped would be foregone.

The loss of these wilderness values is irreversible and irretrievable. Mitigation to retain these values is not possible.

Primitive Recreation/Solitude

Primitive recreation opportunities would be significantly and adversely impacted. Most of the trail system would be lost. Even cross-country travelers would encounter roads and timber harvest. Little solitude could be found as most of the area would be roaded.

Campers at Queen Lake would be less aware of these activities. The nearest harvest units would be approximately one mile away; in one case, over the ridge. In the other case, the unit lies considerably below the lake. The dense tree canopy around the lake limits views to the lake.

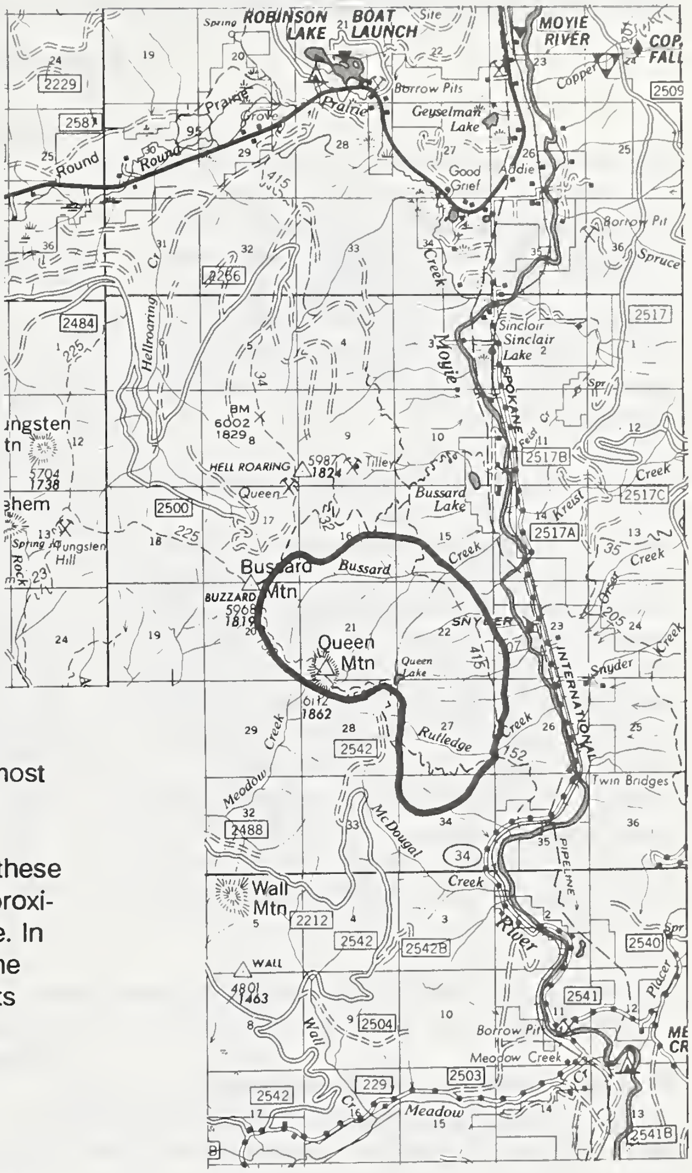


Figure 4-3

Apparent Naturalness/Natural Integrity

Natural values would be adversely impacted. Man's influence would tend to dominate natural forces.

Harvesting and roads, while designed to be only slightly noticeable from key viewpoints, would nonetheless be very noticeable from the area's trail system. Soils would be disturbed, and water yield increased. Sediment levels in streams will increase but not above State standards.

Development of this area will have a subtle cumulative effect on the wild character of northern Idaho. This includes the visual character, wildlife habitat, and primitive recreation opportunities. This alternative is the most intensive development of all the alternatives.

The views of development would be apparent from all the trails and from the vantage points on top of Queen Mountain and Bussard Mountain. Views from the Moyie River would also be adversely impacted. The visual quality disturbance would be at a slightly noticeable level.

The **unique value** of a roadless area is lost.

ALTERNATIVE D

Alternative D would harvest about 705 acres and construct about six miles of road in the roadless area. Harvest would occur on the north, south, and east sides. Approximately 5,600 acres would remain roadless. The remaining roadless area tends to be the area between Queen Mountain and Bussard Mountain and associated higher elevation slopes.

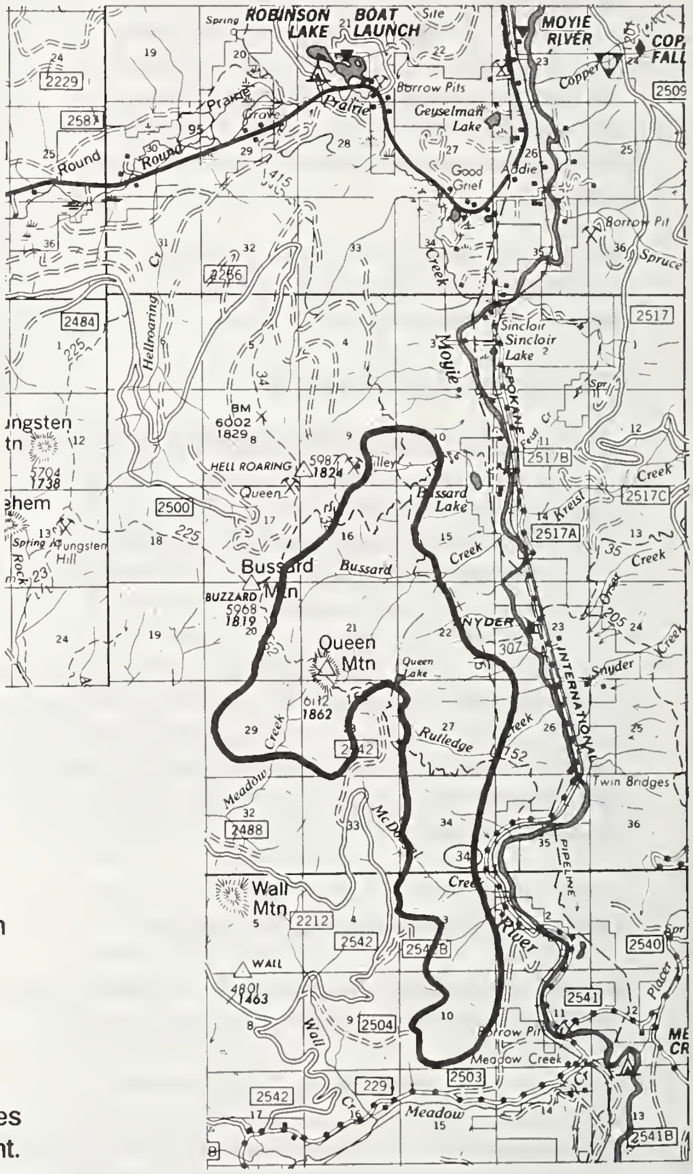


Figure 4-4

Primitive Recreation Opportunities/Solitude

Primitive recreation opportunities would be slightly impacted near the trails because of lower intensity harvesting systems (Unit 111, uneven-aged, and Unit 110, thinning). The noise of logging operations would be heard from almost anywhere in the area. At higher elevations near Queen Mountain, primitive recreation opportunities may be slightly affected. However, the distance would muffle the sounds of logging (one to two miles distant). A new road will cross Trail 152 in two places; this will be an adverse effect for about 1/3 of a mile.

The experience level from the old mining roads used for four-wheeling would remain unchanged.

An area of approximately 5,600 acres would remain available for Congressional consideration for inclusion into the National Wilderness Preservation System.

Apparent Naturalness/Natural Integrity

For about two-thirds of the existing area, natural values remain and natural forces will continue to be dominant. The values will tend to be overridden by man's influence in the developed area.

The views from the Moyie River would be slightly impacted; visual disturbance would be limited to no more than "slightly noticeable." Because most of the units are partial cuts and are downslope or behind

ridges, much of this harvest activity would not be noticeable from Queen Mountain and Bussard Mountain. Development of this area will have a subtle cumulative effect on the wild character of northern Idaho.

Unique Values A significant portion of the roadless area remains. The trails to Queen Mountain and Queen Lake are not affected.

ALTERNATIVE E

Alternative E would not enter the roadless area with harvesting units or road construction. This would leave all the existing roadless area eligible for inclusion into the National Wilderness Preservation System. However, under this alternative, there would be timber harvesting directly adjacent to the roadless area on the north and south ends and on the east side along the Moyie River.

Primitive Recreation/Solitude

The effects on primitive recreation opportunities and solitude are similar to Alternative A, No Action. Primitive recreation opportunities would remain essentially unchanged.

Several cutting units would occur near the roadless area. One unit would be placed near the Bussard Lake trailhead (Unit 33, shelterwood). Two units would be placed 1-1/2 miles south of the Queen Lake trailhead (Unit 7, seed-tree, and Unit 106, salvage). Units 7 and 33 will leave at least 1/3 of the existing tree cover. This will soften the visual impact. Unit 7 will leave less than 15 percent of the tree cover. This will be noticeable to individuals traveling the road to access the Queen Lake trailhead.

The current experience level for motorized users should be retained.

Campers at Queen Mountain will find their experience unchanged. Several units are two miles away. Queen Lake is surrounded by a dense tree canopy which blocks views and muffles noises.

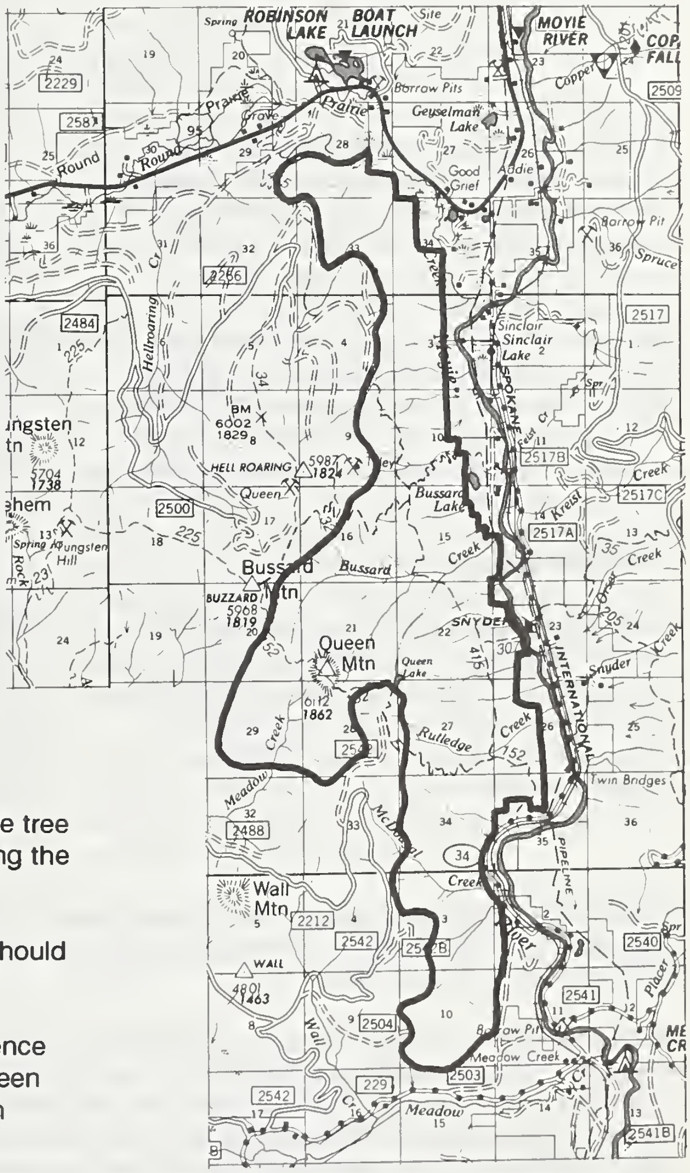


Figure 4-5

Apparent Naturalness/Natural Integrity

The effects on natural values are similar to Alternative A, No Action. Natural integrity and apparent naturalness would remain unchanged for the roadless area. Views from Queen Mountain and Bussard Mountain would remain virtually unchanged, as Bussard Mountain would be a visual barrier to the development north of Bussard Mountain.

Unique Values - The effects on unique values are similar to Alternative A, No Action. **Wilderness Manageability** - The effects on the ease of managing this area as wilderness are the same as Alternative A, No Action.

ALTERNATIVE EH

There would be no road construction under Alternative EH. In addition to the 990 acres that would be harvested under Alternative E, helicopter logging on 25 units, 1514 acres, would affect the eastern portion of the Hellroaring Roadless Area. Seven units of high-risk lodgepole pine stands along the eastern edge would be logged from existing roads or by use of long-line tractor skidding without additional road construction. Approximately 2050 acres around Queen Mountain would remain roadless.

Primitive Recreation/Solitude

Five cutting units border or overlap slightly onto the trail system - units 136, 144, 12, 134 and 138. Harvest activity would be quite visible in Units 136, 12, 134, and 138. The basal area thinning in unit 144 would be slightly noticeable.

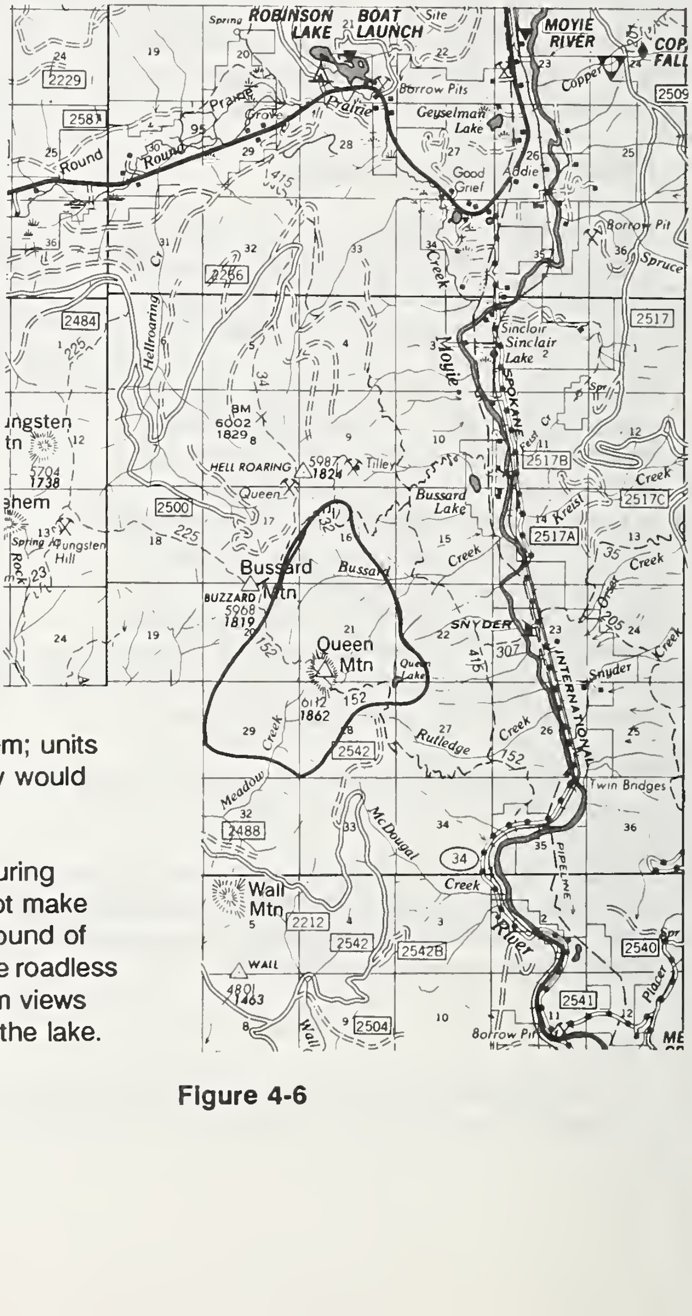


Figure 4-6

Eight cutting units cross segments of the trail system; units 135, 140, 111, 18, 19, 20, 145, 146. Logging activity would be very evident to trail users.

Solitude would be adversely affected, especially during helicopter logging operations. Helicopters would not make flights over the remaining roadless area. But, the sound of helicopters would be audible from all points within the roadless area. People at Queen Lake would be buffered from views and some noise by the dense tree canopy around the lake.

Apparent Naturalness/Natural Integrity

The naturalness of the area would be adversely affected although helicopter logging is not as disturbing or long lasting as road building and even-aged reforestation. Views of development would be much closer to trail users. Bussard Mountain would act as a visual barrier for views to the north. Unit 145 on the north side of Bussard Creek would be slightly noticeable from the trail between Bussard Mtn and Queen Lake.

Unique Values

Roadless character disturbance caused by the helicopter logging would drop the Roadless Area acreage below Congress' 5,000 acre Wilderness Preservation limitation.

Roadless/wilderness values are lost in the short term on about 1,500 acres directly affected by helicopter logging. It would be difficult to predict the time frame needed for natural recovery to a condition which could once again be considered to have these values.

The approximately 2,050 acres which would remain roadless would be a circular pocket around Queen Mountain. Rutledge Creek Trail would cross the center of the area from Queen Lake on the east past Queen Mountain and swing north to Bussard Mountain. Total length of this trail segment is about two miles. Campers at Queen Mountain would find their experience virtually unchanged.

ALTERNATIVE H

Alternative H would harvest approximately 595 acres and construct about eight miles of road within this roadless area. As with Alternative B2, less than 5,000 acres remain roadless; thus, the opportunity for including any of this area into the National Wilderness Preservation System is foregone. This loss is irreversible and irretrievable and cannot be mitigated.

Primitive Recreation and Solitude

The opportunity for primitive recreation and solitude is significantly and adversely impacted. Approximately 60 percent of the area will be roaded. About ten percent of the newly roaded area will have some type of timber harvest. Nearly all the trails will have some disturbance.

Apparent Naturalness/Natural Integrity

Natural integrity would be significantly and adversely impacted. This alternative would locate two clearcut units about 1/4 to 1/2 mile southeast of Queen Mountain. This would bring views of development within the middle ground of Queen Mountain. Another area of harvesting occurs near the lower reaches of Bussard Creek. This would adversely affect roadless values in this vicinity.

Development would not be visible from Queen Lake or from the trail to Queen Lake. Development will have a subtle cumulative effect on the wild character of northern Idaho.

Unique Values - The unique values of a roadless area are significantly reduced because of development.

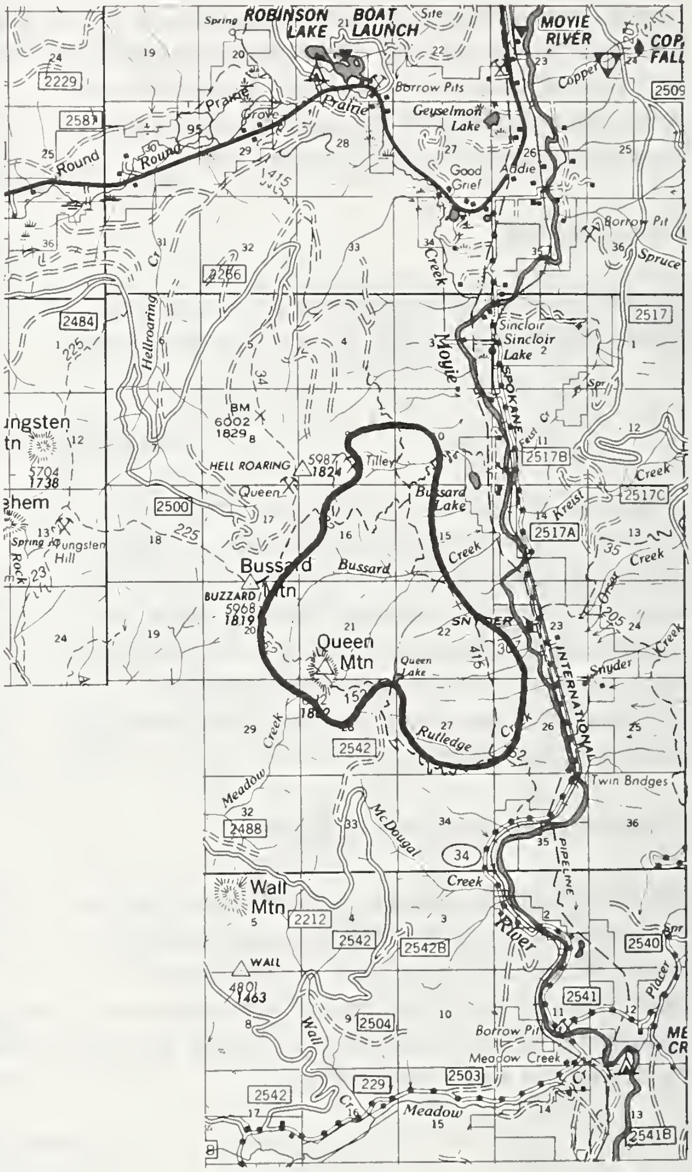


FIGURE 4-7 EFFECTS OF ALTERNATIVE H ON THE ROADLESS AREA BOUNDARY

ALTERNATIVE I

Alternative I would harvest approximately 385 acres and construct about five miles of road within this roadless area. This would be a direct irreversible and irretrievable effect on about 5,400 acres.

The remaining roadless area is about 3,400 acres, so the opportunity for Congress to include this area in the National Widlerness Preservation System is foregone.

Primitive Recreation/Solitude

Roadless wilderness values are foregone on 5,400 acres, especially north and south of Bussard Lake and south of the lower reaches of Rutledge Creek. The roading in Rutledge Creek drainage will significantly impact the lower portions of Trails 152 and 415. This, in turn, will adversely affect current primitive recreation opportunities. One unit also overlaps the Sidehill Trail about one mile south of Bussard Lake (1/5 mile overlaps Unit 20).

Solitude is also significantly impacted due to development and encroachment of development on the area remaining roadless. Roading and harvesting will reduce the sense of isolation.

Apparent Naturalness/Natural Integrity

Natural values will be significantly impacted in the developed area.

The average unit size is reduced because of emphasis on wildlife winter range; this will soften the impacts. These units, however, are seed tree units which will appear much the same as clearcuts. The size of harvest units will significantly reduce their visibility from the Moyie River. Three small clearcut units may be visible from Queen Mountain. These units will move the views of development closer to this key viewpoint.

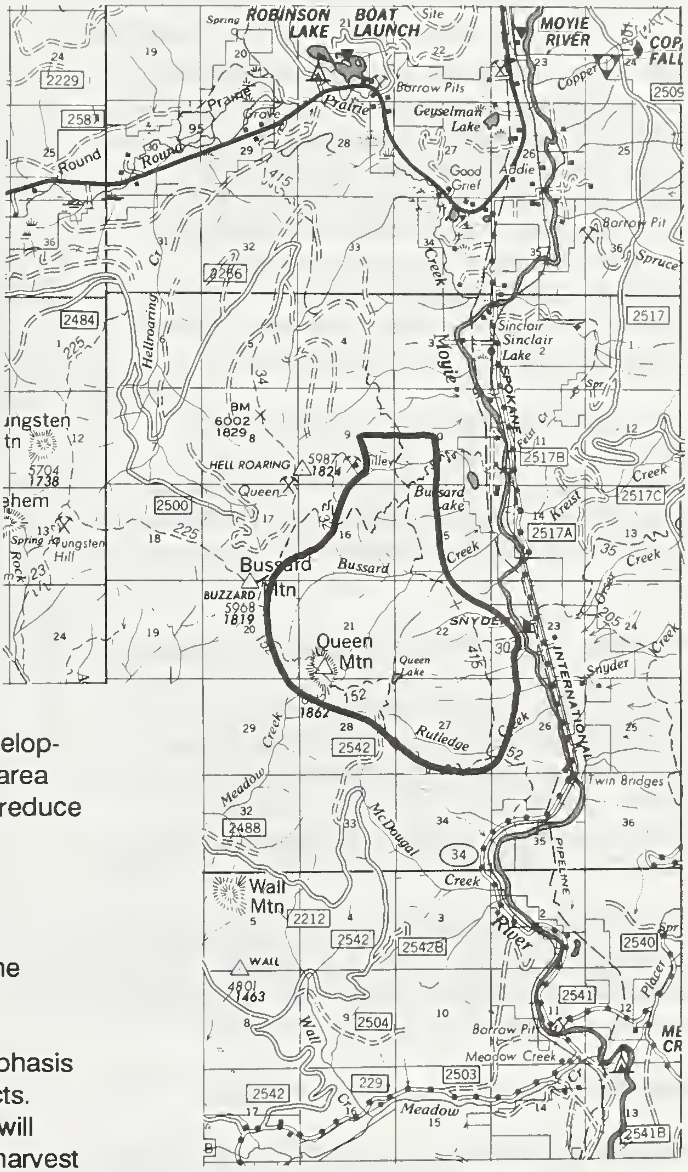


FIGURE 4-8 EFFECTS OF ALT I ON ROADLESS AREA BOUNDARY

The impacts to apparent naturalness and natural integrity are significant and cannot be mitigated. Development has a subtle cumulative effect on the wild character of northern Idaho.

Unique Values - The unique values associated with Queen Lake are retained but the values of being roadless are significantly reduced.

ALTERNATIVE J1

Alternative J1 will harvest approximately 503 acres and construct about five miles of road within the roadless area. Approximately 4,300 acres will remain roadless. Harvesting and road construction will occur primarily in the lower reaches of Bussard Creek drainage in the NW1/4 Section 35 south of Rutledge Creek and in the N1/2 Section 10 north of Bussard Lake. Seven other units are scattered along the edges of the roadless area.

The remaining roadless area is well below the usual 5,000 acre size minimum for consideration for wilderness. This alternative will likely forego the opportunity for Congress to consider this area for wilderness designation.

Primitive Recreation Opportunities/Solitude

This action would considerably reduce the area suitable for primitive recreation. While the remaining area is concentrated in the higher quality areas near Queen Lake and Queen Mountain, development will encroach from three sides and lower the sense of solitude.

Effects on trail use have been mitigated by avoiding road construction or unit layout overlapping any trail. Logging activities would still be visible from several trails and the sounds of logging would still be heard.

Apparent Naturalness/Natural Integrity

Harvesting and road construction will not appear natural and will adversely impact natural integrity. The effects of road construction will be hard to mitigate. The effects of harvesting are softened somewhat by the type of harvesting

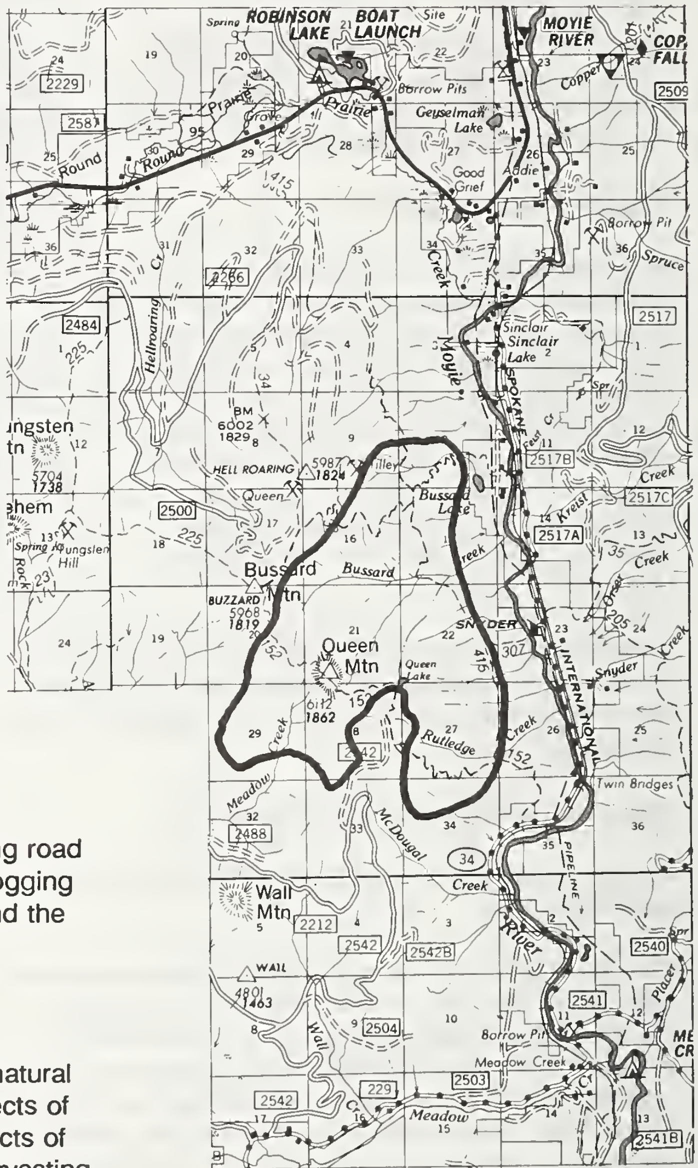


FIGURE 4-9 EFFECT OF ALT J1 ON ROADLESS AREA BOUNDARY

and logging. Generally, long-term shelterwood, uneven-aged management, thinnings, or salvage are systems with less impact on naturalness.

Of the 24 harvest units that are located within the roadless area, nine are seed-tree (138 acres); seed-tree harvesting closely resembles clearcutting. The remaining 15 units (365 acres) are shelterwoods, uneven-age management, thinnings, or sanitation salvage harvest types.

Unique Values

Roadlessness, itself, is a unique value that will be partly foregone as a result of this alternative. While 4,300 acres will remain roadless, the value of the remaining area will be diminished by the encroachment of development. The other unique values, Queen Lake and the higher elevations around Queen Mountain, will remain undisturbed. Most of the development will not be seen from these viewpoints. Some of the units and road construction in the lower Bussard Creek drainage may be visible. These effects will be mitigated somewhat because all of these units (except one) will leave considerable crown canopy.

ALTERNATIVE J2

Alternative J2 will harvest approximately 693 acres and construct about six miles of road within this roadless area. Approximately 3,100 acres will remain roadless. The harvesting and road construction are similar to Alternative J1 except for the addition of four clearcut units south of Queen Mountain. These units will require two additional miles of road construction. There are also four additional units on the east side of the roadless area. However, these are accessed from the same proposed road system and, therefore, will cause little additional effect. The units on the east side of the roadless area are, on average, five acres larger than those in Alternative J1. They will, therefore, be somewhat more noticeable from the Moyie River. Wilderness options are foregone.

Primitive Recreation and Solitude

Most of the area has scattered harvest units; roading encroaches along all sides of the existing roadless area. The Sidehill Trail is crossed with three units (Units 19, 20, and 111). Unit 33 will displace the trailhead for the Bussard Trail. Rutledge Trail will have three units (Units 11, 11A, and 12) located adjacent to the lower portion of the trail; this will result in the trail being crossed at least twice with skid trails. The sounds of logging will be heard from practically all points within the existing roadless area.

This action would considerably reduce the area suitable for primitive recreation. While the remaining roadless area is concentrated in the higher quality areas near Queen Lake and Queen Mountain, development will encroach from all sides.

Apparent Naturalness/Natural Integrity

The additional road construction and clearcut harvesting just south of Queen Mountain will increase the magnitude of the adverse effect on naturalness.

Unique Features

The additional road construction and harvesting will be partly visible from the higher elevations on the south side of Queen Mountain. This will move the views of development much closer than at present.

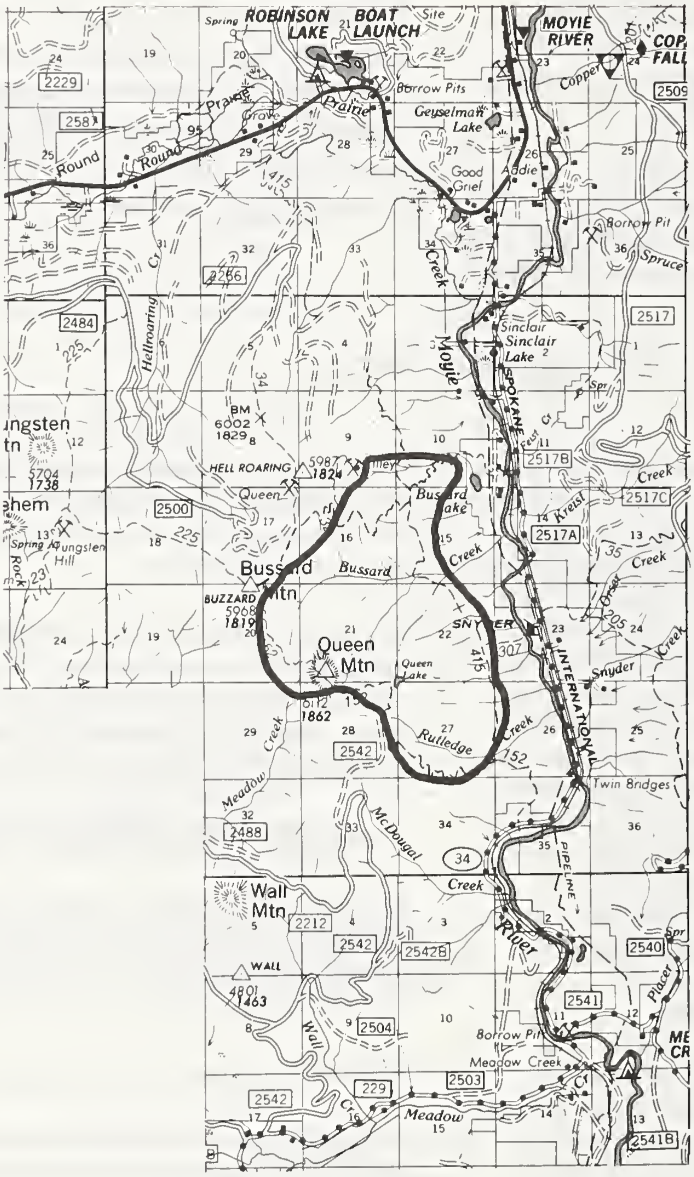


FIGURE 4-12 EFFECT OF ALT J2 ON ROADLESS AREA BOUNDARY

ALTERNATIVE J2H

Alternative J2H will harvest approximately 1,899 acres and construct four miles of road within this roadless area. Approximately zero acres will remain roadless. This alternative was derived from Alternative J2. It adds 1,206 acres of helicopter logging. The helicopter units are all located in the area remaining roadless in Alternative J2.

While the additional area logged (as compared to Alternative J2) is not roaded, it is judged that the roadless character is sufficiently disturbed to disqualify the area as roadless.

Primitive Recreation and Solitude

Alternative J2H would scatter harvest units over most of the roadless area. Helicopter units with this alternative would approach covering the balance of the roadless area not affected by Alternative J2.

Primitive recreation and solitude will be adversely effected, especially during logging. The sounds of helicopters will be audible from all points within the roadless area. After logging, however, the helicopter units should return to a more natural appearing condition, thus lowering the adverse impact to primitive recreation opportunity. Most of the helicopter units leave considerable timber after harvest. Only two helicopter units are shelterwood and one unit is overstory removal, with an overstory of seed trees to be left. The balance leave at least 50 percent of the existing tree canopy.

Apparent Naturalness/Natural Integrity

The additional road construction and clearcut harvesting will increase the magnitude of the adverse effect on naturalness. The helicopter logging will also adversely affect natural processes, although certainly not to the extent roading and even-aged reforestation would.

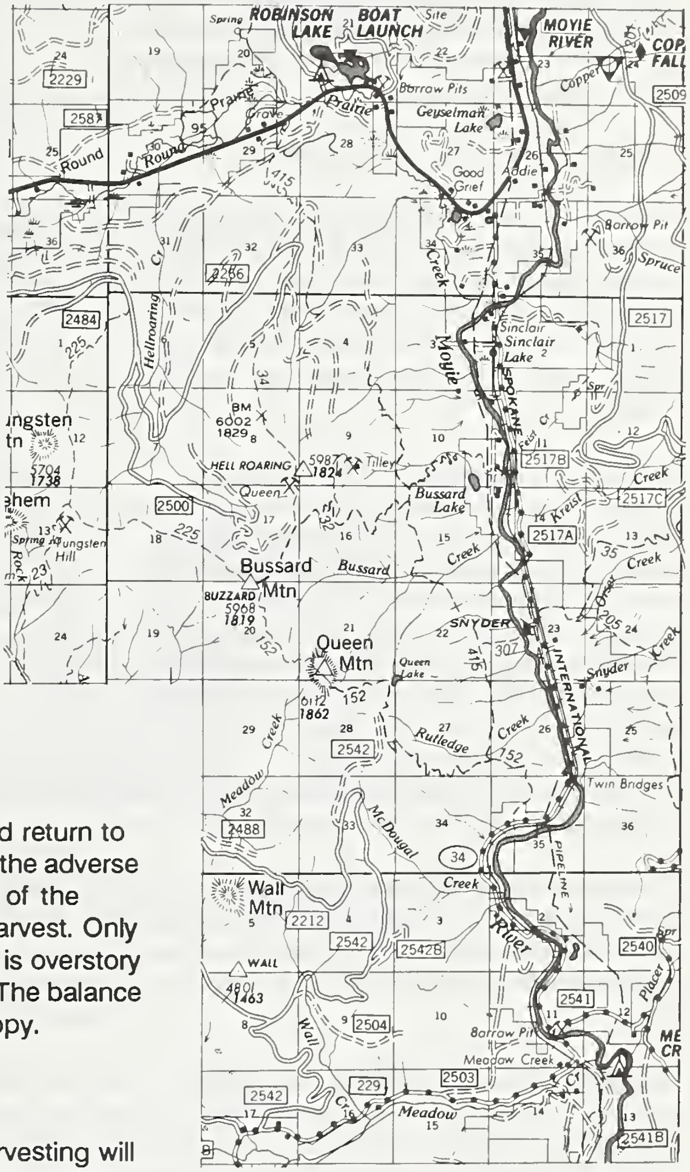


Figure 4-11

Unique Values - The additional road construction and harvesting will be partly visible from the higher elevations on the south side of Queen Mountain. This will move the views of development much closer than at present. Helicopter logging noise will disturb users at Queen Lake and Queen Mountain. It will also disturb residents and visitors of the Moyie River valley.

ALTERNATIVE K

Alternative K will harvest approximately 3090 acres and construct about eight miles of road within this roadless area. Approximately 2130 acres will remain roadless. Wilderness options are foregone.

Primitive Recreation and Solitude

Most of the area has scattered harvest units; roading encroaches along all sides of the existing roadless area. The Sidehill Trail is crossed by nine units (Units 138, 146, 119, 121, 20, 19, 111, 140 and 135). Hellroaring Ridge Trail is crossed by units 129, 130, and 130A.

Unit 33 will displace the trailhead for the Bussard Mtn. Trail. One group selection unit is located along this trail; however, disturbance form this entry would hardly be noticeable. Rutledge Trail will have three units (Units 11, 11A, and 12) located adjacent to the lower portion of the trail. This will result in the trail being crossed at least twice with skid trails. Units 135, 136, and 144 cross the eastern end of Rutledge Trail.
The sounds of logging will be heard from practically all points within the existing roadless area.

This action would considerably reduce the area suitable for primitive recreation. While the remaining roadless area is concentrated in the higher quality areas near Queen Lake and Queen Mountain, development will encroach from all sides.

Apparent Naturalness/Natural Integrity

The additional road construction and group shelterwood just south of Queen Mountain will add to the adverse effect on naturalness. However, it would not be as noticeable as other alternatives which would result in clearcuts.

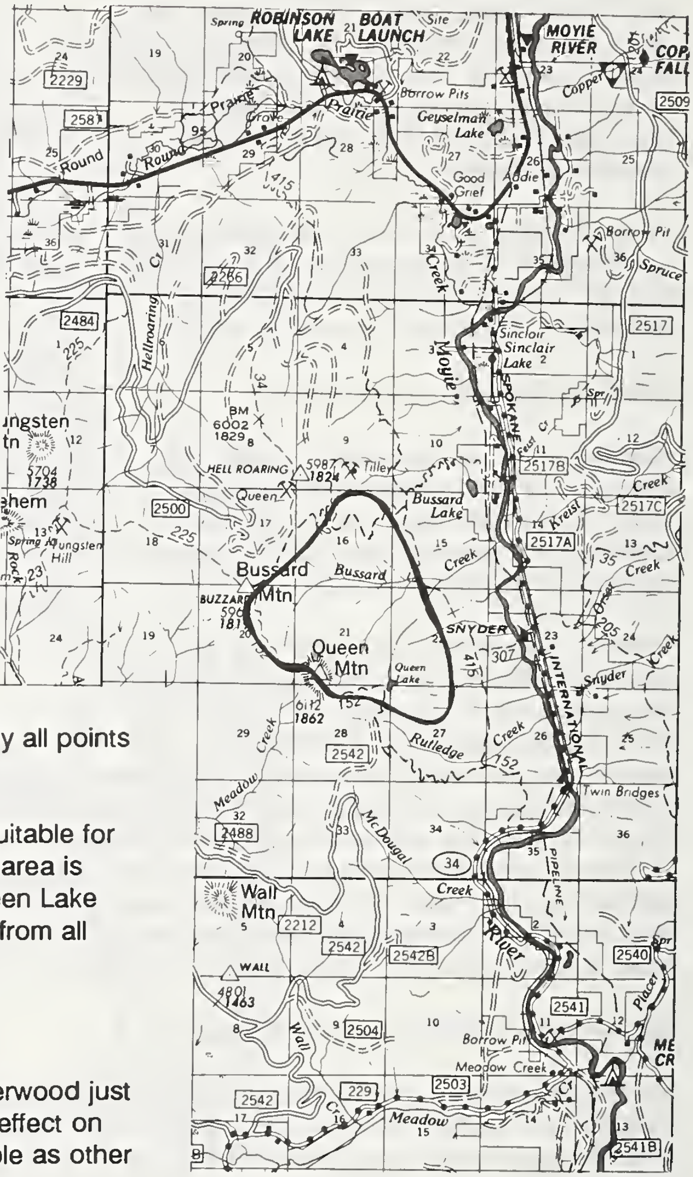


Figure 4-12

Unique Values

The additional road construction and harvesting will be partly visible from the higher elevations on the south side of Queen Mountain. This will move the views of development much closer than at present. Helicopter logging noise would disturb users at Queen Lake and Queen Mountain. It would also disturb resident and visitors of the Moyie River valley.

Comparison of Alternative's Effects on Undisturbed Area

The following graph shows the relative amounts of undeveloped area remaining by alternative. The reference line at 5,000 acres indicates the amount at which Congress may disqualify an area for consideration in the National Wilderness Preservation System.

Disturbance was measured by the number of acres harvested and the miles of road in the area.

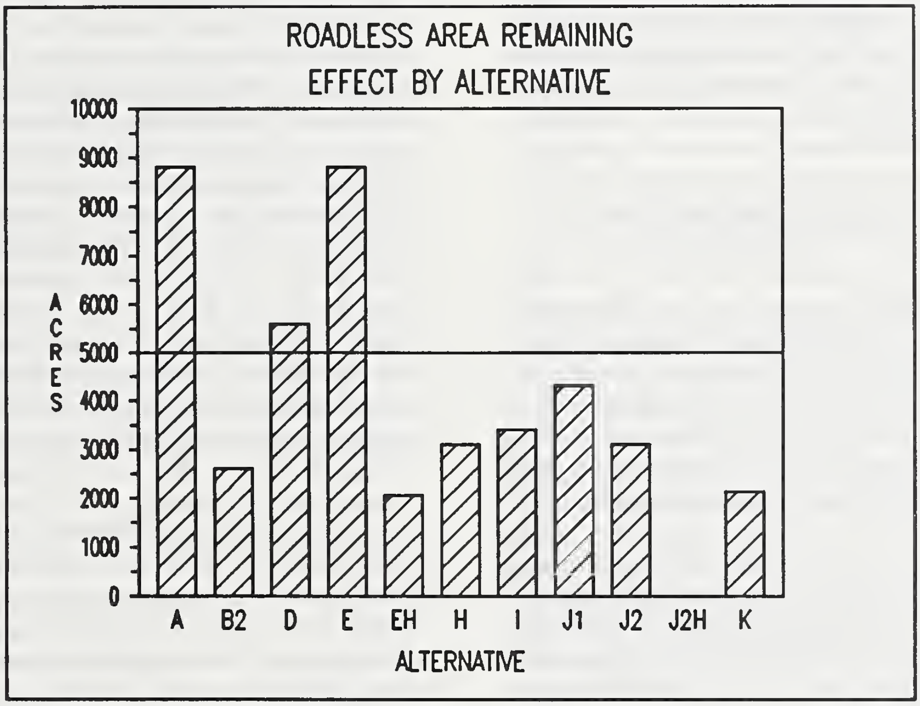


Figure 4-13

Acres remaining undisturbed under each of the alternatives. The **Minimum Wilderness Acreage** line at **5000 acres** indicates the level which Congress has established as the smallest size to be considered for inclusion in National Wilderness Preservation System.

INTRODUCTION

For this analysis within the Decision Area, increases in water yield and sedimentation in streams and the resulting potential for increased bedload movement or stream channel destabilization are considered to be the most influential watershed impacts from the planned activities.

Sedimentation can affect water uses both directly and indirectly. Domestic water supplies receiving raw water from forest surface water supplies must use filtration as an initial treatment. This is directly affected by changing sediment rates. Fisheries may be affected by excessive sediment reaching the spawning gravels which can prevent successful fry emergence, or disrupt the production of organisms basic to the food chain. (Brown, 1985)

Road construction is normally the largest contributor to increased sediment production associated with timber harvesting. This increase in sediment production is due primarily to the additional erosion of exposed soil, compaction of soil resulting in reduced infiltrative capacity of roadbed soils, and the disruption of the natural drainage patterns.

Felling trees is not in itself a cause of increased sediment concentrations. However, the yarding of trees to landings can cause erosion and sediment concentrations to increase if poorly planned and executed. Generally, cable yarding has less impact than ground skidding.

Fire, both wildfire and controlled burning, can also contribute sedimentation to streams. Usually the degree of soil erodibility is directly related to the intensity of the fire. Light fires seldom cause erosion if sufficient organic material is left on the soil surface.

The fact that removal of forest vegetation increases streamflow has been known since the early 1900's. Research conducted across the Nation has verified this fact. Nearly every study in forested zones has shown a pronounced increase in streamflow following forest cuttings or a gradual decrease in streamflow if an area is reforested (USDA Forest Service, 1977b).

Watersheds exhibit great natural variability in flow, and can accommodate some increase in peak flows without damage to the resource. However, when peak flow increases exceed geomorphic thresholds as related to channel stability, the watershed equilibrium will shift in response. Channel scour will occur in headwater reaches and deposition will increase in lower reaches. Increased bedload movement directly impacts fish habitat by reducing the pool characteristics of size, quality, diversity, and frequency of occurance.

The percent increase in peak flow that a watershed can safely accept is dependant on the stability of its channels. All drainages within the Decision Area, except Hellroaring Creek, have stream channels rated at fair to good stability, and can sustain increases between 15 and 20 percent (USDA Forest Service, 1978b). Timber harvest activities that result in increased peak flows significantly less than these thresholds will not cause damage to watersheds or stream channels. Effects of timber harvest on beneficial downstream uses identified in Chapter 3 would also not be noticeable if increased peak flows are significantly less than these threshold levels.

ANALYSIS PROCESS

Activities which alter natural watershed systems in forested environments have been well documented (Anderson et al, 1976; USDA Forest Service, 1977; Brown, 1985). Natural systems generally are in a state referred to as dynamic equilibrium and possess the ability to balance inputs and outputs fairly efficiently.

Forest Management activities have the potential to alter the natural system by changing variables, such as drainage efficiency, canopy cover or soil porosity, to the extent that the natural system is no longer in this equilibrium state and begins to change. The results of this change are reflected most clearly in the streams which best integrate the "impacts" of land management activities.

The science of predicting the state of watershed systems based on the degree and scope of planned management activities is not absolute. Using an infinite amount of data characterizing the land's reaction to natural and planned events would result in perfect models. However, most models used to characterize lands and predict future

outputs are often based on little data and are credible largely by the methods each has built into it to mimic the natural process in nature.

The R1R4 Sediment Model (R1R4)

R1R4 (USDA Forest Service, 1980) is the primary tool used on this project to analyze effects of logging activities on water quality. This model is a sediment prediction procedure applicable to forested watersheds principally associated with Idaho Batholith type geology, but with the capability of adaptation to other forested areas. It produces quantified estimates of sediment for natural (unmanaged) watersheds and estimates sediment yields in response to management, i.e. logging, road building and fire, for a number of years.

The model simplifies, for analysis, an extremely complex physical system and is developed from a limited data base and scientific knowledge. Although it produces specific quantitative values for sediment yield, the results should be treated as broad estimates of how real systems may respond. The model also contains a water yield response model. This portion of the model predicts changes in total water yield as a function of forest canopy management over time.

Together the outputs of these models represent changes that can occur in natural watershed systems. The validity of these models is best when the results are used to predict the probability of protecting beneficial uses of water from nonpoint source pollution produced by the various alternatives. The modeled outputs provide predictions that can be compared to monitored results of activities.

Development and Calibration of the R1/R4 Sediment Yield Model

The IPNF soil/landtype inventory was designed to fit the framework of the R1/R4 model, in order to give the most accurate sediment yield predictions possible.

The basic soil/landtype units were designed to take into account all the identifiable, differentiating criteria which influence: geologic erosion rates; slope sediment delivery ratios; mass erosion hazard ratings; and erosion mitigation potential. Coefficients were developed for the differentiating criteria on each basic soil/landtype unit, along with average slope percent, land unit slope factors, and base rates for natural sediment yield.

The final step in the sediment yield prediction procedure was the calibration of the model to actual measured total sediment from key Forest watersheds, which represent most major geology types occurring on the Forest. These watersheds are listed in Forest Plan Amendment Number One.

IPNF Forest Plan Sediment Model

A second model, the IPNF Forest Plan sediment model (USDA Forest Service, 1987h), was also used to determine sediment outputs and its effect on spawning site conditions. The model was assembled using measured data on the Forest and predictions of the erosiveness of certain lands compared to a base rate by geology and slope. The model predicts relative changes in fish emergence success based upon increases in sediment delivery for each drainage. Since the accuracy and scientific value of the model outputs are questionable at best, the results of the model are located in the appendix as recommended by the IPNF fisheries biologist (see Appendix C).

FOREST PLAN FURTHER ANALYSIS

Appendix I of the Forest Plan lays the groundwork for further analysis when proposed actions do not meet the Forest Plan minimum fry emergence of 80 percent. This further analysis could be summarized as follows:

Field measurements of spawning sites composition and associated estimates of trout emergence success.

Stream surveys to determine condition and stability of stream course.

Specific location of harvesting units and roads, both existing and proposed, with their relationship to soil characteristics,

slopes, aspects, and vegetation condition taken into account. The R1R4 sediment model utilizes these factors when calculating sediment and water yield outputs.

Harvesting systems and site preparation systems and their effect on sediment and water yields, also considered with the R1R4 sediment model.

Based on the above analysis, specialists provide the deciding officer with their best professional judgement on the impacts of the proposed project on the water resource.

Emergence success as predicted by the IPNF sediment model in East Fork of Meadow Creek is currently below Forest Plan standards and Hellroaring Creek is at the minimum standard. Therefore, the Forest Plan Further Analysis was triggered. Stream surveys, spawning habitat surveys, field reviews by the regional and forest hydrologist and forest fisheries biologist, and the more detailed R1R4 model were used to develop and analyze additional data. The forest hydrologist and fisheries biologist reviewed this additional data. Their recommendations are included in Appendix C.

THE MOYIE RIVER

Cumulative Effects Common to All Alternatives

Reasonably Foreseeable Future Actions

The proposed construction of a new gas line adjacent to the existing Pacific Gas Transmission (PGT) line that follows the Moyie River is a reasonably foreseeable future action. The construction corridor is located adjacent to and crosses the Moyie River several times. This activity is expected to occur during the same time period that activities associated with the proposed action are scheduled. It would have a cumulative impact to the water quality of the Moyie River. PGT has contracted with a consultant firm to prepare an Environmental Impact Statement to document the effects of the proposed pipeline.

The effect of this action would be temporarily increased sediment introduction into the river and a negligible increase in water yield due to additional clearing of forest land for the corridor. The pipeline crosses the river several times. A one-time introduction of sediment would occur when ditches are dug adjacent to the existing pipeline and through the river bed to accommodate the new pipeline. Vegetative recovery on the disturbed soil would reduce the sediment yield in two to three years.

With PGT's agreement to cooperate with the fisheries habitat improvement projects in coordination with the U.S. Forest Service and the Idaho Department of Fish and Game, the cumulative effect of the gas pipeline construction and the West Moyie timber sales will be a net benefit to fisheries habitat in the Moyie River. PGT will place rock drop structures in the river below each pipeline crossing. These structures will improve fish habitat diversity by creating pools for rearing and overwintering fish.

In addition to the proposed action, other reasonably foreseeable future actions which are common to all alternatives include: salvage harvest, overstory removal on seedtree and shelterwood harvested units, and continued limited mining exploration. Mining exploration could involve minor amounts of soil disturbance from low standard access road construction and mineral exploration activities. Although anticipated to be minor, this would result in a cumulative increase in sediment production within the Moyie River drainage.

The remaining activities are projected to occur from existing roads or roads constructed under one of the alternatives of this DEIS. Their effects would normally, disregarding catastrophic occurrences, be incidental compared with any of the alternatives.

In addition, future road construction and timber harvesting within the Moyie River drainage will likely occur before the impacts of the proposed action on water quality have recovered to a stable level. The effects of such actions would have a cumulative effect on the water quality of the Moyie River and tributaries. Depending on the amount of road construction and timber harvesting, the impacts to the Moyie River system would be similar in nature to the alternatives analyzed for the Decision Area.

The continuation of development and logging on private lands within the Moyie River Drainage is a reasonably foreseeable future action. The extent of this development is unknown. Any development that disturbs soil or modifies vegetation will have a cumulative impact on the water quality of the drainage. The impact would be similar in nature to those of the alternatives considered, however the extent of the impact would depend on the amount of development.

The current limiting factor in the Moyie River for fish production, the beneficial use, is lack of pools. Past activities such as log drives, timber cutting along the river, and wildfires have contributed to the current lack of large woody debris. Some of this material would provide pool/cover habitat when it fell into the river. Investigations have revealed that the current condition is stable, that is the bedload is not "shifting" around and, that given expected future activities this situation is not expected to change under any alternative. Because of this current condition it is not felt that activities in British Columbia (Canada) are limiting fish habitat.

Reflecting past and present management, the current water quality and stream channel conditions of the Moyie River are good, see Chapter 3 description of the physical characteristics of the river. Because we are limiting the water yield increases (peak flows) to recommended levels it is believed that the current stable condition would be maintained in all alternatives. If future activities within the Moyie River drainage continue at approximately the same intensity, the current condition should not deteriorate and could actually improve over the existing conditions.

INDIRECT EFFECTS

Increases in water yield and sediment delivery to stream channels are direct effects of the proposed action and alternatives on the water quality. This is discussed by alternative on the following pages. The indirect effects of these increases could be changes in stream channel stability and/or bedload movement that could physically alter fish habitat components.

ALTERNATIVE B2

Increases in peak flow in Hellroaring Creek, as a result of the activities that would be implemented with Alternative B2, could result in increased bedload movement and stream channel degradation. Increased bedload deposits in the aluvial fan reach of this stream could occur with this alternative. This would in turn likely cause the stream to more frequently change channel locations. There would likely be a loss in pool habitat for fish within this portion of Hellroaring Creek. Highway 95 serves as a detention basin for aluvial deposits and as sediment trap for Hellroaring Creek prior to its confluence with Round Prairie Creek. Because Round Prairie Creek is a slow moving meandering stream course for most of the distance it runs across the northern end of the Decision Area, and Highway 95 acts as a sediment trap, Alternative B2 would unlikely result in increased sediment delivery or bedload movement in the Moyie River.

The indirect effects of Alternative B2 on the remainder of the drainages within the Decision Area would be minimal. The increases in water yield, especially peak flow, would be so minimal that there would be little risk of increasing bedload movement. There would also be little risk in degrading stream channel stability in the remaining drainages. There would be no quantitative changes in fish habitat conditions, see Appendix C.

ALTERNATIVES D, E, EH, H, I, J1, J2, J2H, AND K

The indirect effects of these alternatives on the drainages within the Decision Area would be minimal. The increases in water yield, especially peak flow, would be so minimal that there would be little risk of increasing bedload movement. There would also be little risk in degrading stream channel stability in any of the drainages. There would be no quantitative changes in fish habitat conditions resulting from these alternatives, see Appendix C.

CONSUMPTIVE USES

The Forest Plan standards for activities within public water systems include: manage public water system plans for multiple use by balancing

present and future resources with public water supply needs; and project plans for activities in public water systems will be reviewed by the water users and the State (Forest Plan, page II-3). The Beeline Water Assocation and the State of Idaho Water Quality Bureau were involved in the project planning prior to the release of the DEIS (see project files and Appendix C). In addition, each received a copy of the DEIS. As discussed in the following pages, all alternatives would meet the State of Idaho proposed standards for a public water system.

Bussard Creek and an unnamed creek in the center of section three, just north of Bussard Lake, have been identified as individual water sources. The Forest Plan standards for individual water systems include: manage to fisheries streams standard (maintain 80% emergence); or manage to maintain existing biota. Maintenance of existing biota will be defined as maintaining the physical integrity of these streams (Forest Plan, page II-3).

All alternatives meet both criteria in Bussard Creek, see following discussions on Bussard Creek by alternative and Appendic C. The small stream in the center of section three is too small to apply models to, it is approximately 100 acres. No alternatives would construct roads or prescribe regeneration harvesting within this small drainage, Alternatives EH, J2H, and K would helicopter sanitation/salvage harvest within the drainage. All BMP's applying to class one streams would be applied with these alternatives to ensure that the physical integrity of this stream would be maintained.

UNAVOIDABLE EFFECTS OF ALL ACTION ALTERNATIVES

To a degree, timber management activities associated with all action alternatives have an unavoidable effect on water yield and sediment production, and therefore on water quality. The extent of effect depends on the amount and type of activity and the mitigation measures applied to reduce impacts.

Unless stated otherwise, mitigation measures factored into the analysis include: 1) seeding and fertilizing road cuts and fills, 2) use of slash wind rows at the base of fill slopes at stream crossings to reduce sediment yield from roads, and 3) Providing for buffer strips between roads and sensitive land types and buffer strips between harvest units and streams located on sensitive land types (see maps of buffer strips in project files). It is estimated that these measures will reduce sediment production by at least 25 percent (USDA Forest Service, 1980).

Additional mitigation measures to further protect water quality for domestic water supply were factored into the analysis of all roads constructed within Upper Meadow Creek. They include: 1) seeding and mulching road cuts and fills, and 2) use of slash windrows at the toe of all fill slopes to trap sediment from roads. It is estimated that these measures will reduce sediment yield by 65 percent (USDA Forest Service, 1980). No mitigation measures were factored into the analysis to reduce water yield increases.

Table 4-3

PEAK SEDIMENT PERCENTAGE OVER BASE RATES FOR ALL ALTERNATIVES

DRAINAGE PEAK YEAR	BASE TONS	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Hellroaring Ridge 1994	42	16	33	16	16	16	33	16	25	25	25	25
Hellroaring Creek 1995	74	13	83	16	16	16	25	25	33	33	33	33
Little Hellroar'g Cr 1995	24	14	35	28	35	35	35	21	35	35	35	35
Bussard Lake 1995	90	0	155	83	5	20	127	50	50	50	50	55
Bussard Creek 1995	41	0	35	5	0	0	5	5	5	5	5	5
Snyder 1995	49	0	40	40	0	14	25	3	48	51	51	55
Upper Meadow Creek 1996	86	8	25	8	3	8	25	16	8	16	16	25
Rutledge Creek 1995	23	0	5	0	0	5	5	0	5	5	10	10
Rutledge Creek Trail 1995	52	0	128	89	0	25	107	117	107	107	107	114
McDougal Creek 1996	39	20	40	24	28	24	24	20	36	36	44	40
Wall Creek 1995	37	7	100	53	7	7	61	7	7	38	38	46
M'dow Cr Tributaries '96	46	4	134	4	4	4	4	4	69	69	69	73
Meadow Creek 1996	20	9	118	9	9	9	9	9	9	9	9	14

Table 4-4

WATER YIELD PERCENT PEAK FLOW OVER NATURAL RATES

DRAINAGE PEAK YR	BASE CFS / MONTH	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Hellroaring Ridge 1994	20.0	5	5	5	5	5	5	5	5	5	5	5
Hellroaring Creek 1995	37.5	5	8	5	6	6	6	6	6	6	6	6
Little Hellroar'g Cr 1995	10.5	6	7	6	7	7	7	7	8	8	8	7
Bussard Lake 1995	30.1	2	6	3	2	4	3	3	3	3	4	4
Bussard Creek 1995	14.5	0	2	0	0	1	0	0	1	1	1	1
Snyder 1995	10.6	0	4	1	0	5	2	1	1	2	5	3
Upper Meadow Creek 1996	46.2	1	2	1	1	1	2	2	1	2	2	2
Rutledge Creek 1995	6.9	3	4	3	3	4	3	3	3	4	4	4

WATER YIELD PERCENT PEAK FLOW OVER NATURAL RATES (continued)

DRAINAGE PEAK YR	BASE CFS / MONTH	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Rutledge Creek Trail 1995	10.8	0	4	1	0	5	3	2	2	2	6	6
McDougal Creek 1996	9.1	3	4	3	4	4	4	4	5	5	5	4
Wall Creek 1996	16.9	5	5	5	5	5	5	5	5	5	5	5
M'dow Cr Tributaries '96	10.9	1	2	1	1	1	1	1	1	1	1	1
Meadow Creek 1996	10.1	2	2	2	2	2	2	2	2	2	2	2

ALTERNATIVE A - NO ACTION

No Action implies that there would be no outputs from the Decision Area. The fact is, activities that have previously taken place in several of the sub-watersheds will be influencing the sediment and water yield recovery line into the mid 1990's.

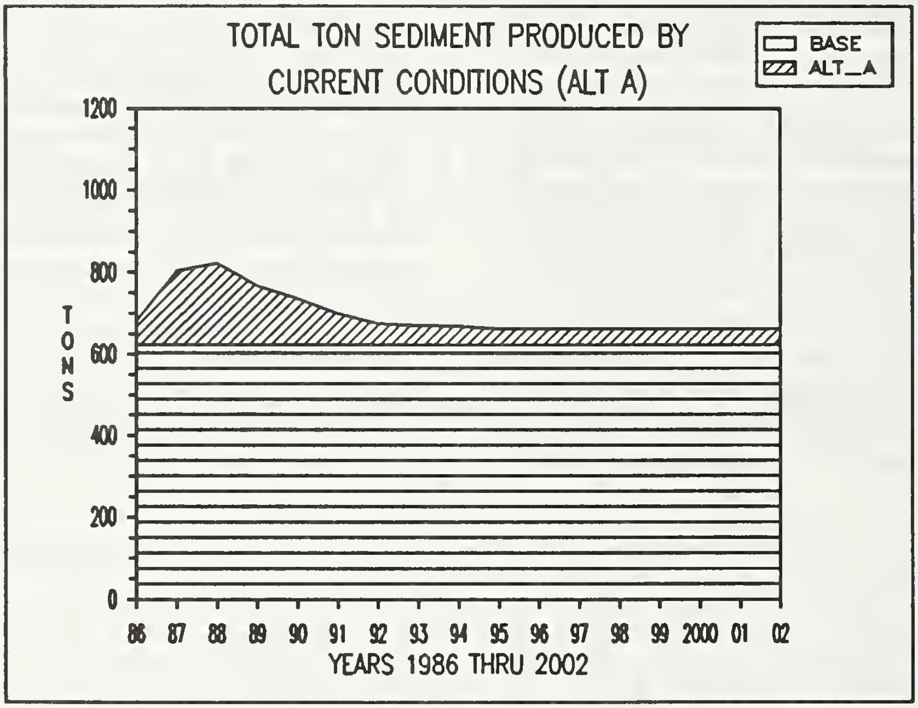


FIGURE 4-14

This chart shows total sediment outputs for the Decision Area; reflecting the continuing influence of past activities. The natural undisturbed base rate for sediment production is 619 tons.

Model predictions for the total gross sediment outputs for the entire area are for a 12 percent increase over the natural undisturbed base rates for the seventeen year period (1986 to 2002). Taken into account are all past management activities that have ocurred within the Decision Area or within portions of the modeled drainages that fall partially outside the Decision Area boundary. The increases in sediment production in the late 1980's are due primarily to road building and to a lesser degree from harvesting trees.

Showing sediment yield increases over a period of time such as this dilutes the meaning when expressed as a percentage over base. It does however, enable the reader to compare the existing situation and future impacts from timber harvesting activities to modeled impacts from past management activities. With this information, one will be able to compare each alternatives impact with past impacts and determine if the alternative is "lighter on the land" than past activities have been. It also can be used to identify each alternatives contribution of sediment to the Moyie River System as compared to past sediment contributions to the system from the Decision Area.

Also recovering is the water yield increases from those basins where logging activities took place from the mid to late 1980's. Activities in Hellroaring Creek, Little Hellroaring Creek, Rutledge Creek, McDougal Creek, Upper Meadow Creek, and Wall Creek have resulted in predicted water yield increases through the 1990's. The increases in water yield and sediment production in these drainages have not been of a magnitude to be considered threatening to channel stability.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

The R1R4 model predicted sediment and water yield for this drainage are currently at natural levels. This model considers the ridgeline primitive road at the head of the drainage to be recovered.

Hellroaring Creek

The Hellroaring Creek fishery is not considered significant due to the small size of resident fish. It does however, contribute to the water quality of Round Prairie Creek which is a system given more importance by the Idaho Fish and Game. Highway 95 serves as a detention basin and sediment trap for Hellroaring Creek prior to its confluence with Round Prairie Creek, thus water delivered to Round Prairie Creek is usually of high quality. Round Prairie Creek is a slow moving meandering stream course for most of the distance it runs across the northern end of the Decision Area. Immediately downstream of Hellroaring Creek, Round Prairie Creek does not contain the energy necessary to move quantities of sediment to the Moyie River and in fact serves as a sediment trap.

Disturbances to Lower Hellroaring and Round Prairie include stream bed channelization, stream bank disturbance by domestic livestock, and impoundment by beavers. A major portion of Lower Hellroaring and Round Prairie are on private property.

Based on R1R4 predictions, the current (1991) water yield increase is six percent over base. The peak flow is six percent over base. With no additional activities the peak flow will decline to five percent in 1995 and four percent in 1998. There is a corresponding recovery in the annual water yield increase.

Upper Meadow Creek

The turbidity monitoring records from the Beeline Water Association agree with the R1R4 predicted sediment yields. These records indicate that there was an increase in turbidity in 1987 that coincided with road reconstruction and timber harvesting upstream from the water system intake. The increase in turbidity levels were mostly evident during the spring runoff months. By 1989, this turbidity declined to a level just above the 1986 levels. The R1R4 model estimated that the sediment yield increase returned to 1985 levels in 1989.

Maintenance records from the water association also support the R1R4 predictions. Road construction and timber harvesting in the drainage in 1976 resulted in a sediment yield increase of 41 percent. In 1976 through 1978, the Beeline Water Association had to clean out their reservoir with a backhoe each year.

Based on R1R4 predictions, the current (1991) water yield increase is two percent over base. The peak flow is two percent over natural conditions.

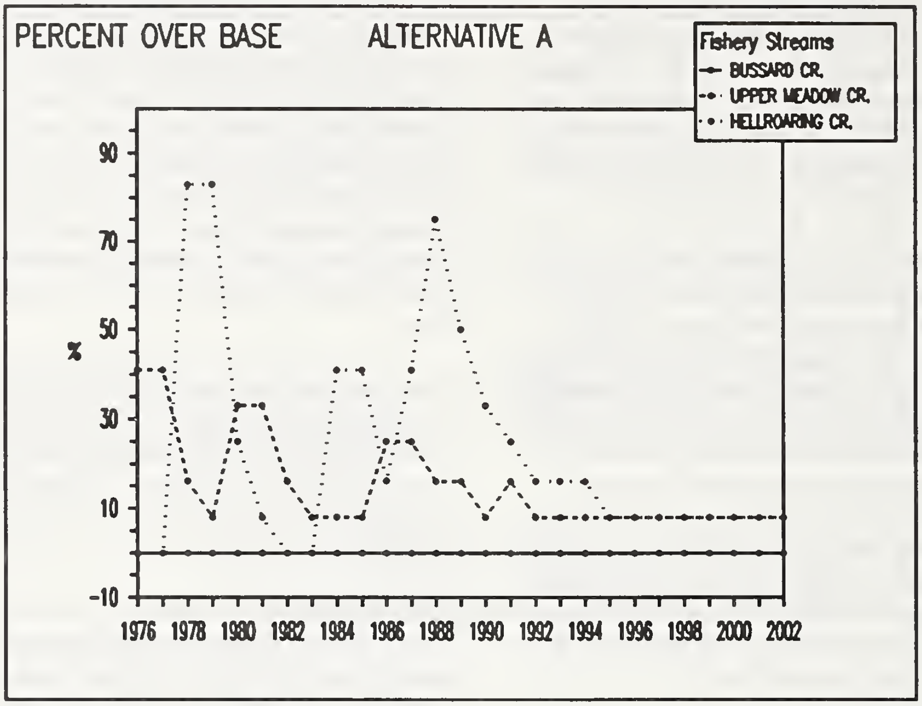


FIGURE 4-15

The above graph depicts the sediment production over base for the three drainages over time. Increased sediment production begins with management in the drainage and is shown to be presently recovering to a level near the base rate. All figures are based on R1R4 model outputs.

The downward trend of recovery for sediment outputs is significant. The cumulative effects of the 1980's logging most likely peaked from 1987 to 1990 and those effects, as the model shows, are declining.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Other watersheds are essentially at base rates for water yield and sediment production and would not undergo any activity induced changes and output would remain stable, altered only by natural events.

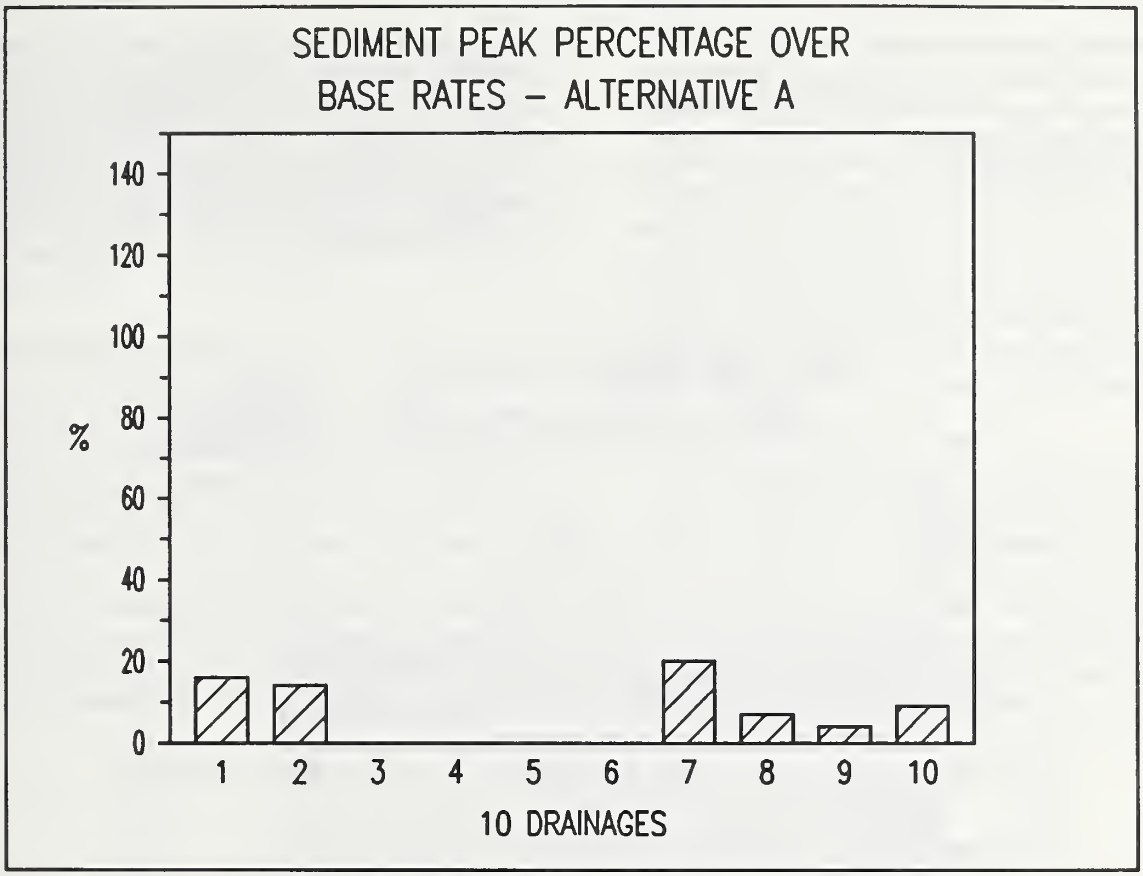


FIGURE 4-16

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

The above chart displays the sediment increase above base rates, for the drainages listed beneath the chart, if no further action were taken in the Decision Area.

ALTERNATIVE B2

Alternative B2 results in the highest degree of activity in the Decision Area. These activities are spread over time, accounted for in three separate timber sales and spatially entail portions of most of the thirteen watersheds.

There would be a predicted increase of sediment production of 24 percent over base rates with this alternative. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

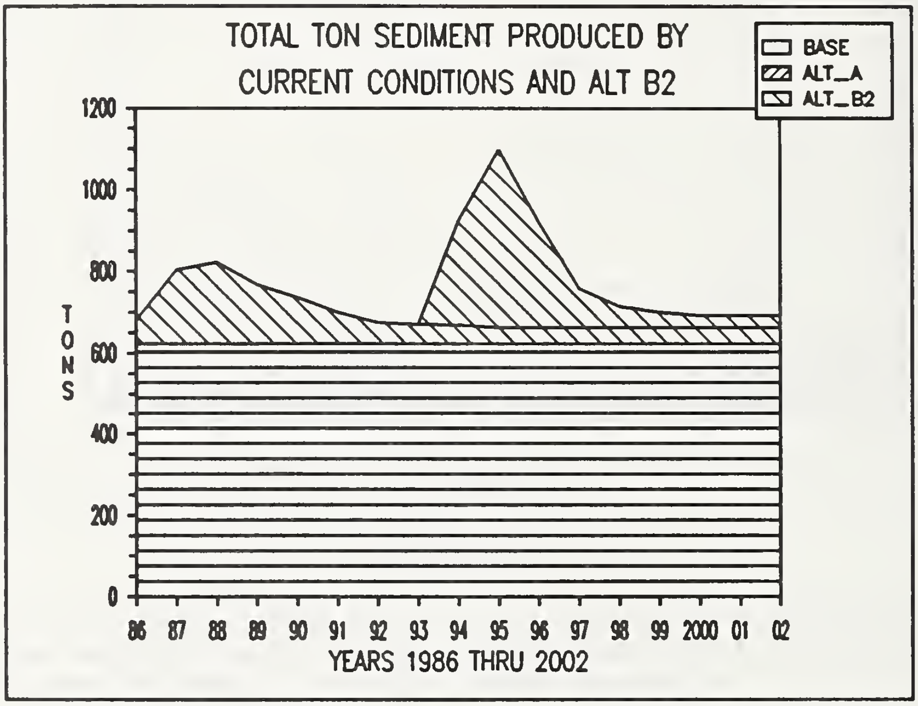


FIGURE 4-17

This chart shows the effect of Alternative B2 on total sediment production in the Decision Area. Base rate is 623 tons of sediment.

As can be seen in figure 4-17, recovery is rapid in the first two years following activity. Logging activities begin in 1994; a sharp rise in sediment outputs are depicted. These then taper off at a fairly constant rate to the end of the decade where they predictably will approach, but will never quite reach, base rate. This information was formulated using predictions from the R1R4 sediment model.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on R1R4 predictions, the current water yield and peak flows are at natural levels. This alternative would increase the average annual water yield to two percent above base in 1995, recovering to one percent over base in 1999. The peak flow would also increase two percent in 1995 and recover to a one percent increase in the year 2001.

Hellroaring Creek

Based on R1R4 predictions, the current water yield and peak flow increases are six percent over natural rates. This alternative would increase the average annual water yield to seven percent above base in 1995, this would recover to six percent over base in 1999. The peak flow would increase to eight percent in 1995 and recover to a six percent increase in year 2000. This increase in peak flow is above the recommendation to maintain current channel stability. This alternative may result in increased bedload movement and could result in degrading channel stability, and degrading pool habitat for fish in the lower reach of Hellroaring Creek.

Upper Meadow Creek

Stream surveys found the stream channel and banks to be in good condition. Field sampling of spawning gravel sediment structure, the State of Idaho study of the Beeline Water Association filter system in Upper Meadow Creek, and Beeline turbidity monitoring all agree with the R1R4 model predictions. R1R4 predicted the peak sediment yield at 25 percent over base in 1996 with this alternative.

Based on R1R4 predictions, the current water yield and peak flows are two percent over base. With no further activity in the drainage, water yield would recover to a one percent increase by 1995 and peak flow would recover to a one percent increase in 1996. This alternative would increase the average annual water yield and peak flows to two percent above base in 1996.

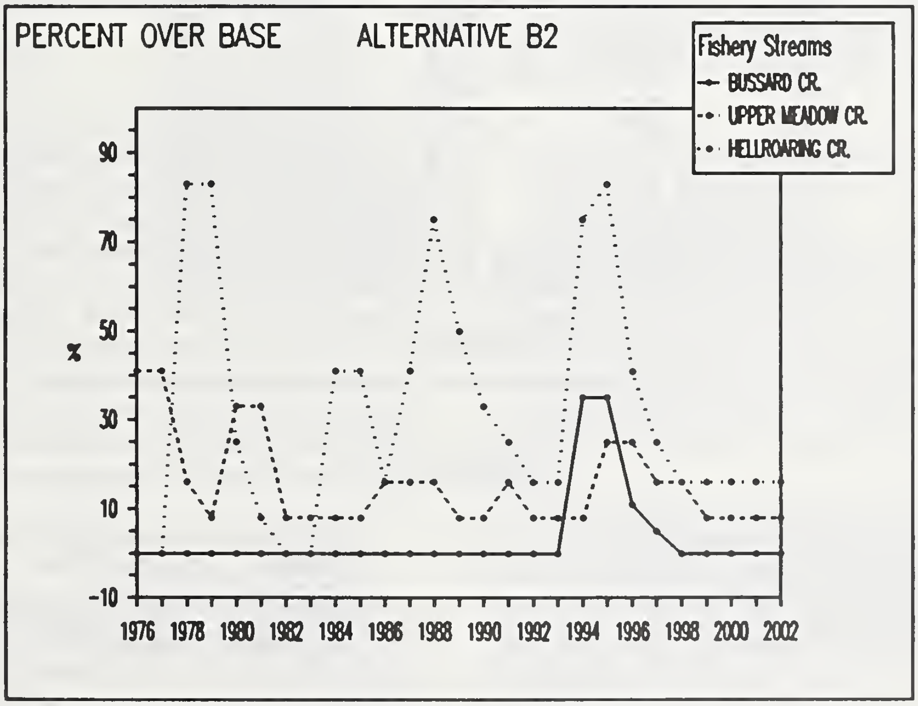


FIGURE 4-18

The above graph depicts the sediment production over base for the three drainages over time. Increased sediment production begins with management in the drainage and is shown through the recovery period associated with activities of this alternative. All figures are based on R1R4 model outputs.

NON CONSUMPTIVE/NON FISHERIES STREAMS

The remaining 10 drainages within the Decision Area fall into this category. Some of the drainages, such as Hellroaring Ridge, Wall Creek, and Meadow Creek (the steep face on the north side of lower Meadow Creek) all drain into fisheries streams and will contribute to the condition of the fisheries stream but in themselves are not considered fisheries.

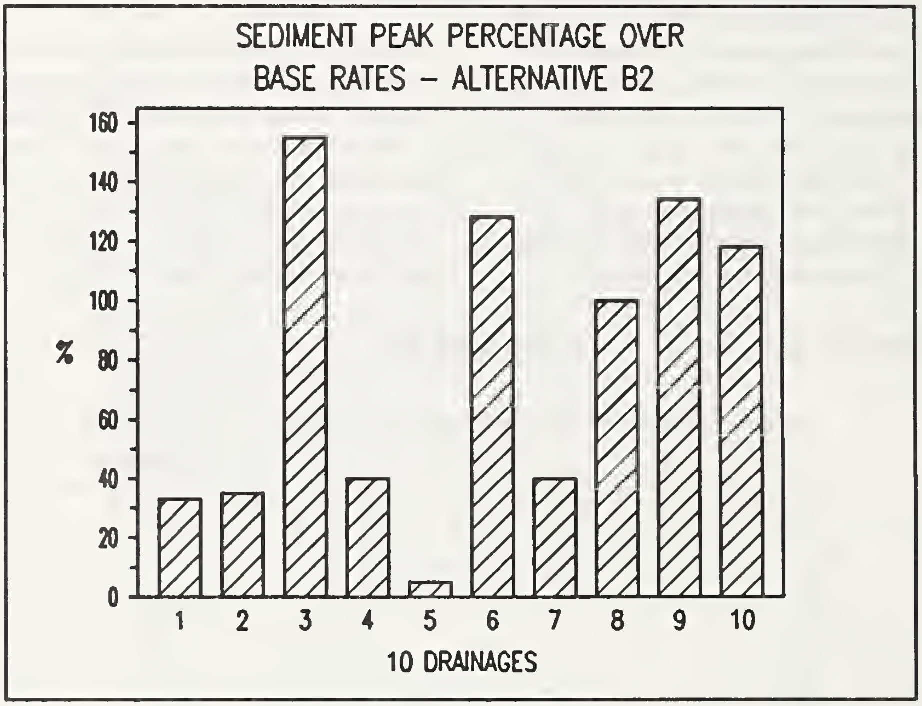


FIGURE 4-19

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

This chart outlines the sediment produced over base rates for the ten drainages listed below the chart.

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from a five percent increase over base with the Rutledge Creek unit to 155 percent over base in the Bussard Lake unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in Figure 4-18, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on interpretation of outputs from the R1R4 model, stream surveys, and field reviews of this stream, Bussard Creek would clearly be within Forest Plan standards and State of Idaho Department of Fish and Game fisheries objectives.

Hellroarlng Creek

Based on the further analysis for Hellroaring Creek and the IPNF forest hydrologist's and fisheries biologist's recommendations, this alternative does not meet Forest Plan Objectives for the drainage. This alternative could result in a decrease in stream channel stability in the lower reaches of Hellroaring Creek. This would in turn increase the frequency of stream channel shifts on the aluvial fan and could result in a reduction in the quantity and quality of pools in the lower segment of the stream. Therefore this alternative would not be consistent with Forest Plan objectives for Hellroaring Creek.

Upper Meadow Creek

Based on R1R4, timber harvesting activities in 1986 resulted in an increase of sediment yield of three tons per square mile. Turbidity monitoring by the Beeline Water Association during 1985 through 1989 indicated that this increase in sediment yield did not result in turbidity levels that exceeded proposed state turbidity standards for drainages feeding a public water system. Given the information on predicted sediment yields and turbidity monitoring, the State of Idaho's Water Quality Bureau, determined that an increase of three tons (25 percent) would be the maximum allowable increase in sediment yield for Upper Meadow Creek (Skille, 1990).

Based on the further analysis for Upper Meadow Creek, the forest hydrologist and State Water Quality Bureau recommendations, this alternative would be consistent with Forest Plan objectives for this drainage. It would also meet the State Water Quality Bureau objectives for drainages feeding public water supply systems. In addition it would meet Beeline Water Association objectives as it would not cause an impact greater than occured from timber harvesting activities in 1986.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Given the sediment and water yield data, and the application of Best Management practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE D

Alternative D's design would produce approximately the same amount of sediment within the Decision Area as Alternatives H, J1, J2, and J2H. While Alternative D would harvest much less timber than these alternatives, it would result in approximately the same amount of road construction; the largest contributor to sediment yield.

Based on R1R4, there would be a predicted increase of sediment production of 18 percent over base rates with this alternative. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

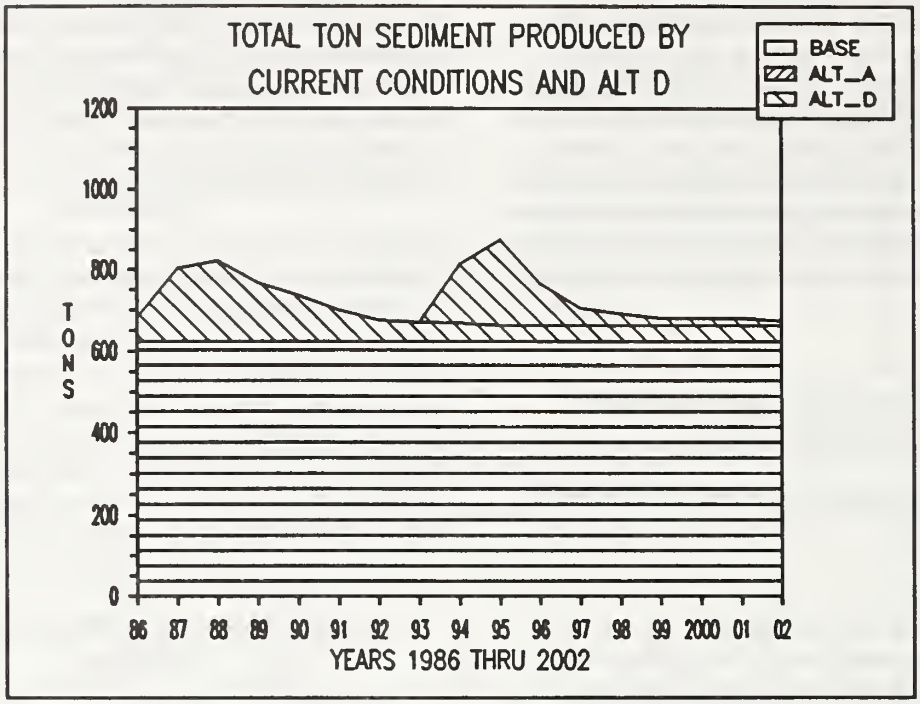


FIGURE 4-20

The base rate for total sediment is 623 tons.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on R1R4 predictions, this alternative would not change the water yield or peak flow by any measurable amount.

Hellroaring Creek

Based on R1R4 predictions, the current water yield and peak flow increases are six percent over natural rates. As with sediment production, this alternative would not increase the average annual water yield or peak flow above previous levels. It would however, slow by one year the recovery time for annual water yield increases, but would not affect the recovery in peak flow rate recovery towards natural rates.

Upper Meadow Creek

Stream surveys found the stream channel and banks to be in good condition. As with Alternative B2, additional data agreed with the R1R4 model predictions. This model predicted no change in sediment yield with this alternative.

Based on R1R4 predictions, the current water yield and peak flows are two percent over natural rates. Implementation of this alternative would not change the recovery of water yields or peak flows (two percent increase each) resulting from a proposed sale within the drainage in 1991.

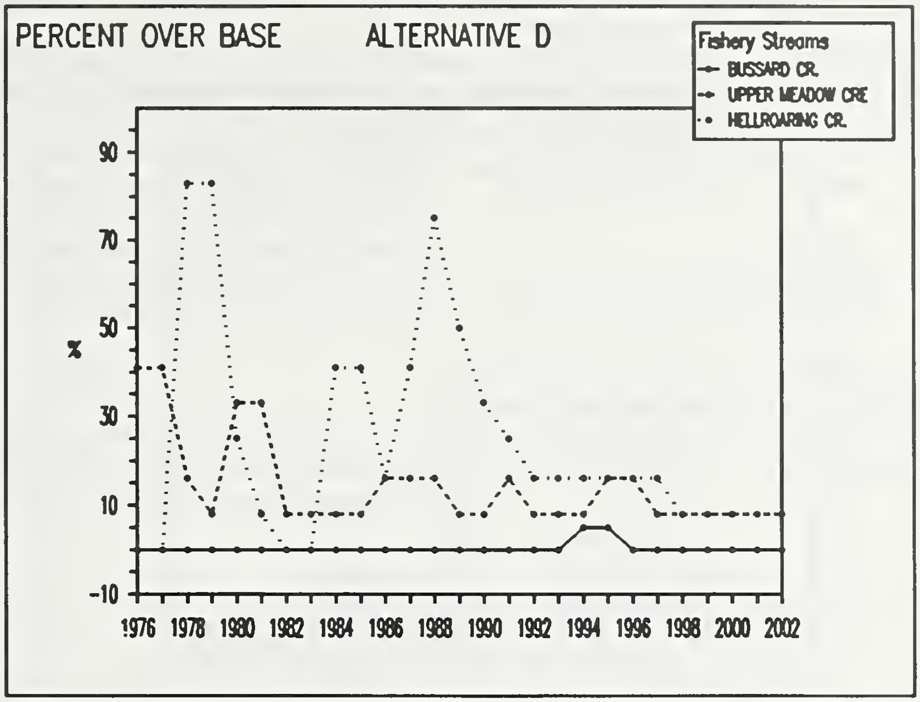


FIGURE 4-21

Figure 4-21 depicts the sediment production over base for the three drainages over time. The sediment production increase in Upper Meadow Creek with this alternative would be less than increases that ocurred in 1980 and 1981 from timber harvesting activities. The sediment yield increase in 1980-1981 did not cause the Beeline Water Association's reservoir to fill with sediment, nor did it result in extensive cleaning of the reservoir. Likewise this alternative should not cause extensive reservoir cleaning. All figures are based on R1R4 model outputs.

NON CONSUMPTIVE/NON FISHERIES STREAMS

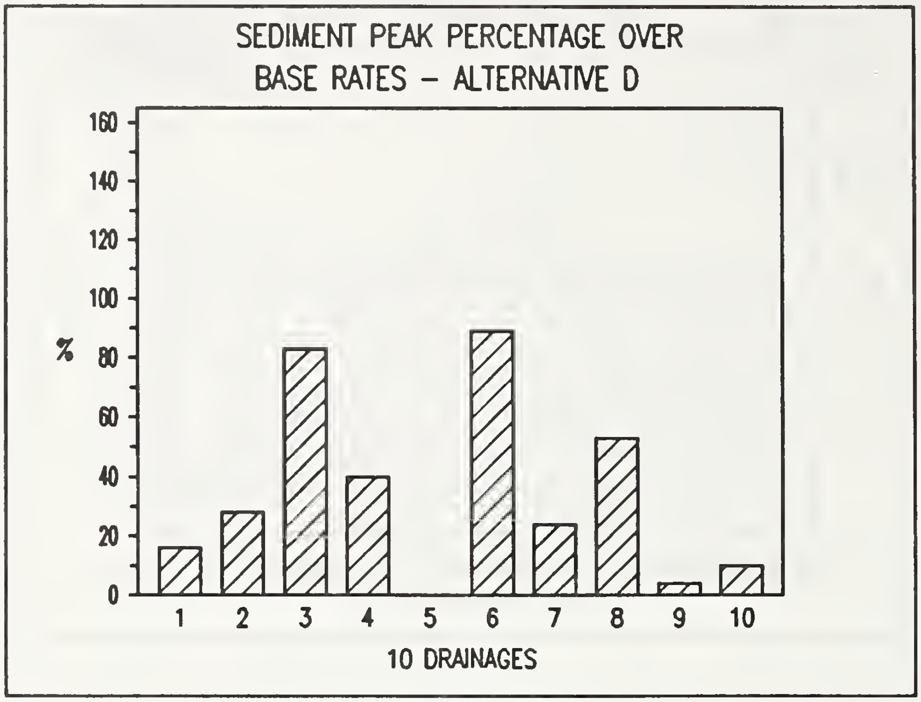


FIGURE 4-22

DRAINAGE 1 - Hellroaring Ridge	**DRAINAGE 6 - Rutledge Cr Trail**
DRAINAGE 2 - Little Hellroaring Cr	**DRAINAGE 7 - McDougal Creek**
DRAINAGE 3 - Bussard Lake	**DRAINAGE 8 - Wall Creek**
DRAINAGE 4 - Snyder	**DRAINAGE 9 - Meadow Cr Tributaries**
DRAINAGE 5 - Rutledge Creek	**DRAINAGE 10 - Meadow Creek**

This chart displays the sediment increase over the base rate for the drainages listed beneath the chart.

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from no increase over existing with the Rutledge, Meadow Creek, and Meadow Creek Tributary units to 89 percent over base in the Rutledge Creek Trail unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in Figure 4-21, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on interpretation of outputs from the R1R4 model, stream surveys, and field reviews of this stream, Bussard Creek would clearly be within Forest Plan standards and State of Idaho Department of Fish and Game fisheries objectives.

Hellroaring Creek

Based on the further analysis for Hellroaring Creek and the IPNF forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. There would be no increased risk of bedload movement or stream channel degradation. This would provide for beneficial downstream uses. Therefore, this alternative should meet State of Idaho Dept. of Fish and Game fisheries objectives.

Upper Meadow Creek

Based on the further analysis for Upper Meadow Creek, the forest hydrologist's recommendations, and recommendations from the State Water Quality Bureau (Skille, 1990) this alternative would meet Forest Plan and State of Idaho objectives for this drainage. It would not cause a reduction in fisheries habitat in Meadow Creek. It also would not raise the sediment yields in the drainage. Therefore, it should also meet the objectives of the Beeline Water Association.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Given the sediment and water yield data, and the application of Best Management Practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE E

Alternative E would result in the least amount of additional sediment production from the Decision Area. This is due to this alternative's lack of road construction, the single largest contributor to sediment yield.

Based on R1R4, sediment yield would increase to 13 percent over base. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

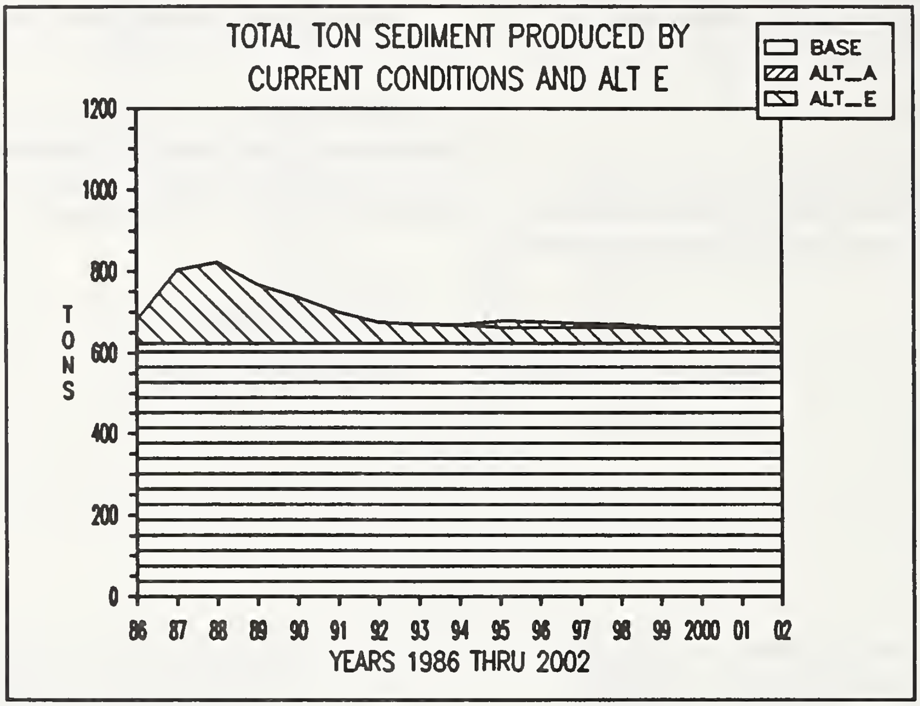


FIGURE 4-23

This chart show total sediment production in the Decision Area. The base rate is 623 tons.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

As no road construction or timber harvesting would take place in this drainage, there would be no increase in sediment production, water yield or peak flow with this alternative. All outputs from the drainage would remain at natural levels.

Hellroaring Creek

Based on R1R4, the peak sediment yield for Hellroaring Creek is predicted to be 16 percent over base in 1995 through 1997. As with Alternative D, this alternative would result in maintaining the predicted 1994 sediment outputs for four additional years, thereby slowing the recovery of previous activities in this drainage.

Based on R1R4 predictions, this alternative would postpone by two years the recovery time for water yield increase and length of peak flow. It would

not however, increase the average annual water yield or peak flow above existing levels.

Upper Meadow Creek

As no road construction or timber harvesting would take place in this drainage, there would be no increase in sediment production, water yield, or peak flow with this alternative. All outputs from the drainage would remain at current levels.

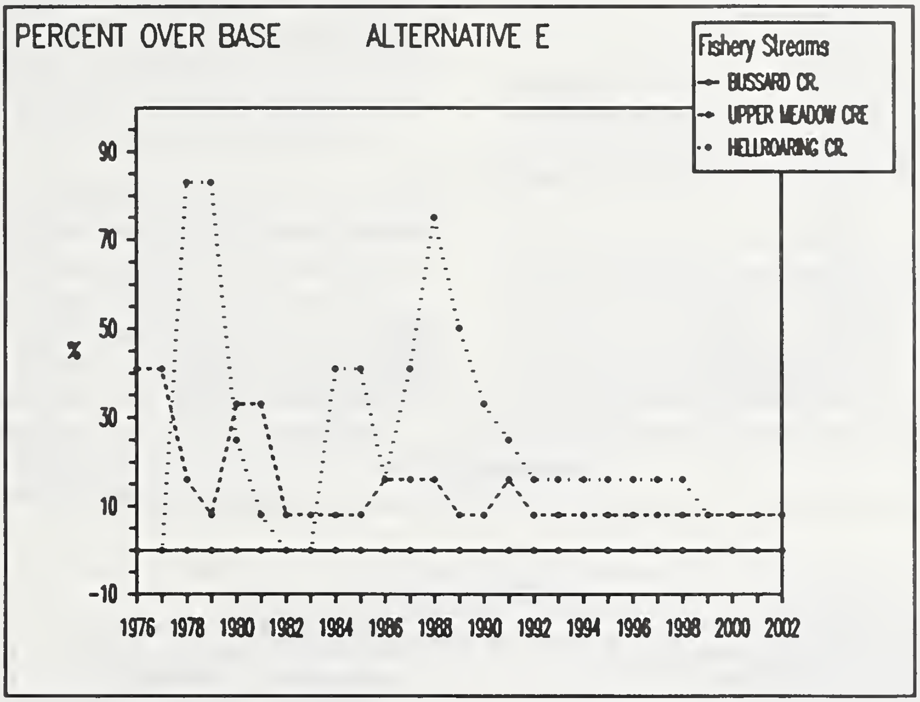


FIGURE 4-24

The above graph depicts the sediment production over base for the three drainages over time.

NON CONSUMPTIVE/NON FISHERIES STREAMS

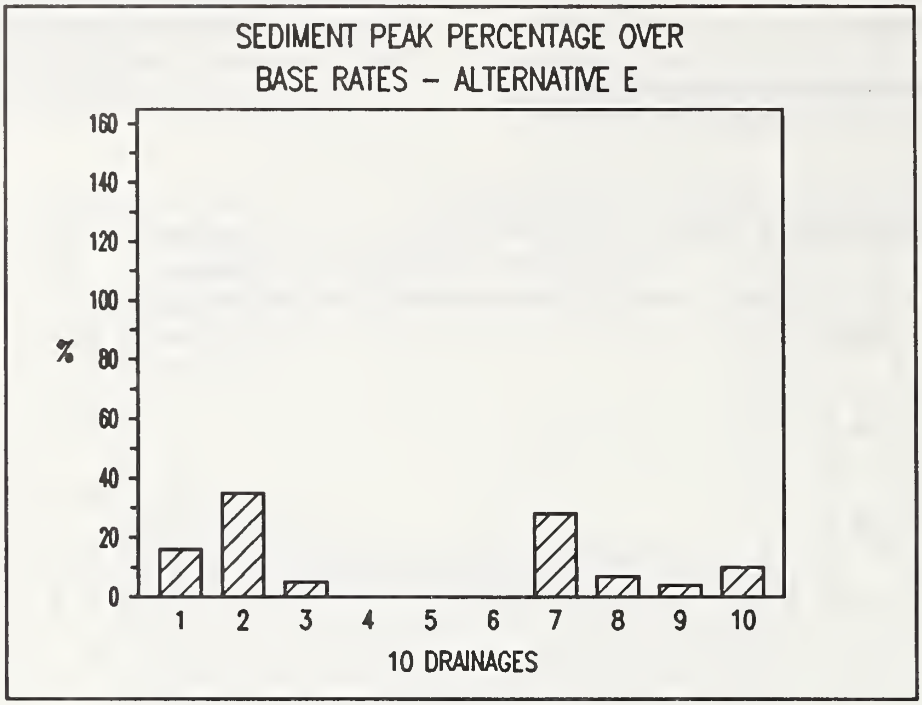


FIGURE 4-25

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from no increase over existing with the Hellroaring Ridge, Snyder, Rutledge, Rutledge Cr. Trail, Meadow Cr. Tributary, Meadow Cr. Face, and Wall Cr. units to 35 percent over base in the Little Hellroaring Creek unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in Figure 4-24, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek and Upper Meadow Creek - There are no activities planned in Bussard Creek and Upper Meadow Creek with this alternative. As previously presented the current water quality in these drainages fully provide for beneficial downstream uses. As there would be no impact to the Beeline Water Association water supply system, this alternative would meet their objectives.

Hellroaring Creek - Based on the further analysis for Hellroaring Creek and the IPNF forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. There would be low risk of increasing bedload movement and low risk of causing stream channel degradation. This would provide for beneficial downstream uses and should be consistent with State of Idaho Dept. of Fish and Game objectives for these drainages.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Given the sediment and water yield data, and the application of Best Management Practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE EH

Alternative EH's design would produce a quantity of sediment within the Decision Area among the lowest of any alternative. This is due to the lack of road construction with this alternative.

Based on R1R4, there would be a predicted increase of sediment production of 18 percent over base rates with this alternative. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

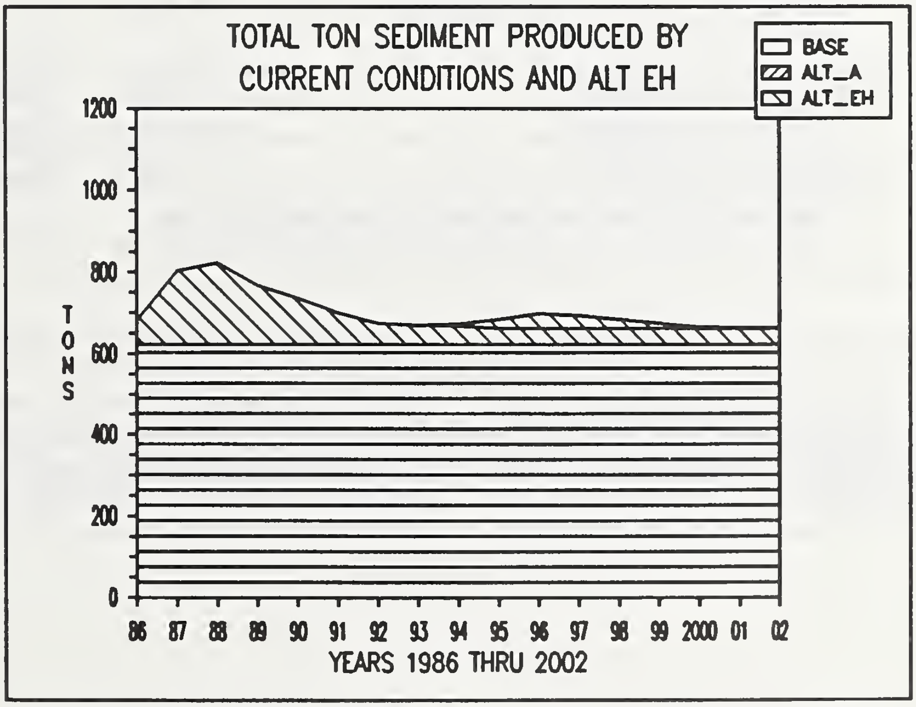


FIGURE 4-26
The base rate for total sediment is 623 tons.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on R1R4 predictions, this alternative would increase the water yield and peak flow one percent over natural rates in 1996.

Hellroaring Creek - Based on R1R4 predictions, the current water yield and peak flow increases are six percent over natural rates. As with sediment production, this alternative would not increase the average annual water yield or peak flow above previous levels. It would however, slow by two years the recovery time for water yield increases.

Upper Meadow Creek - Stream surveys found the stream channel and banks to be in good condition. As with Alternative B2, additional data agreed with the R1R4 model predictions. This model predicted no change in sediment yield with this alternative.

Based on R1R4 predictions, the current water yield and peak flows are two percent over natural rates. Implementation of this alternative would not change the current water yields or peak flows as no roads would be constructed or timber harvested in this drainage.

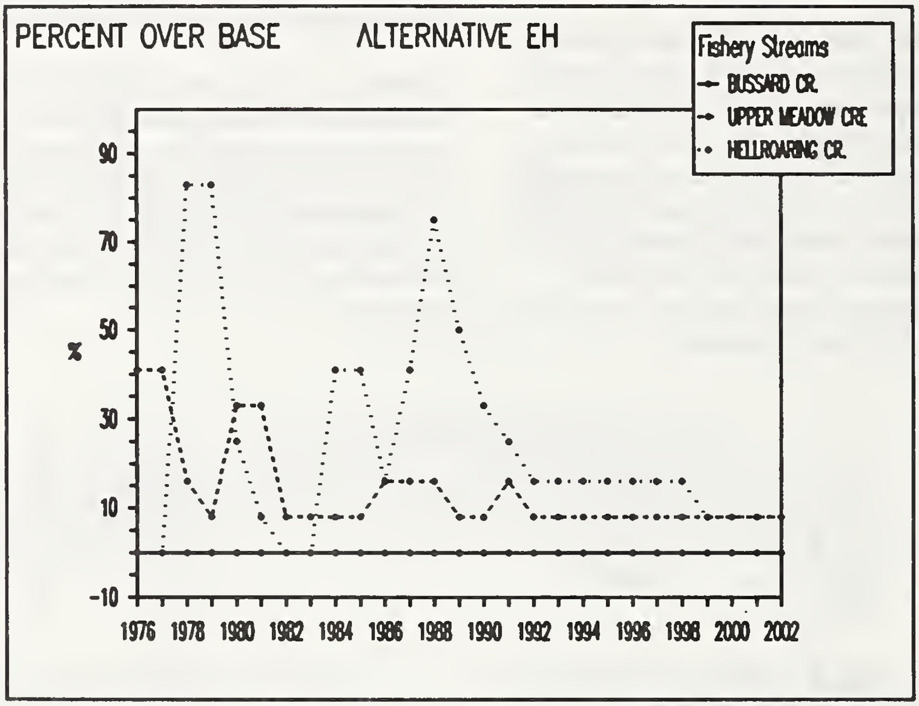


FIGURE 4-27

Figure 4-27 depicts the sediment production over base for the three drainages over time. There would be no sediment or water yield increase in Upper Meadow Creek with this alternative. All figures are based on R1R4 model outputs.

NON CONSUMPTIVE/NON FISHERIES STREAMS

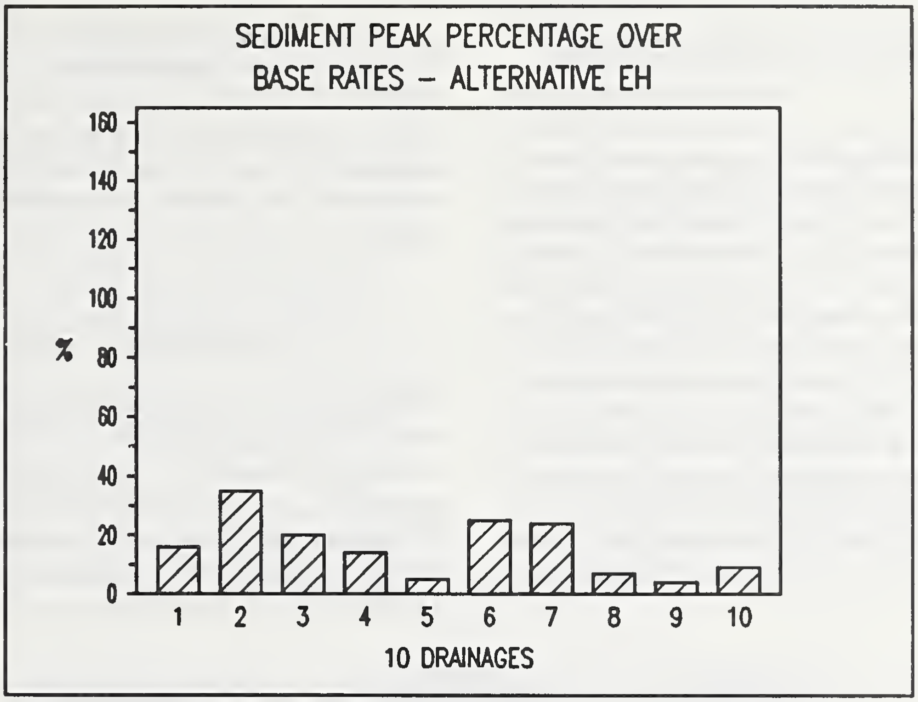


FIGURE 4-28

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

This chart displays the sediment increase over the base rate for the drainages listed beneath the chart.

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from no increase over existing with the Hellroaring Ridge, Meadow Creek, Meadow Creek Tributary, and Wall Creek units to 35 percent over base in the Little Hellroaring Creek unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in FIGURE 4-27, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on interpretation of outputs from the R1R4 model, stream surveys, and field reviews of this stream, Bussard Creek would clearly be within Forest Plan standards and State of Idaho Department of Fish and Game fisheries objectives.

Hellroaring Creek - Based on the further analysis for Hellroaring Creek and the IPNF forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. There would be no increased risk of bedload movement or stream channel degradation. This would provide for beneficial downstream uses. Therefore, this alternative should meet State of Idaho Dept. of Fish and Game fisheries objectives.

Upper Meadow Creek - There would be no change in the condition of this drainage.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Given the sediment and water yield data, and the application of Best Management Practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE H

Based on R1R4, Alternative H would result in a predicted increase of sediment production of 19 percent over base rates. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

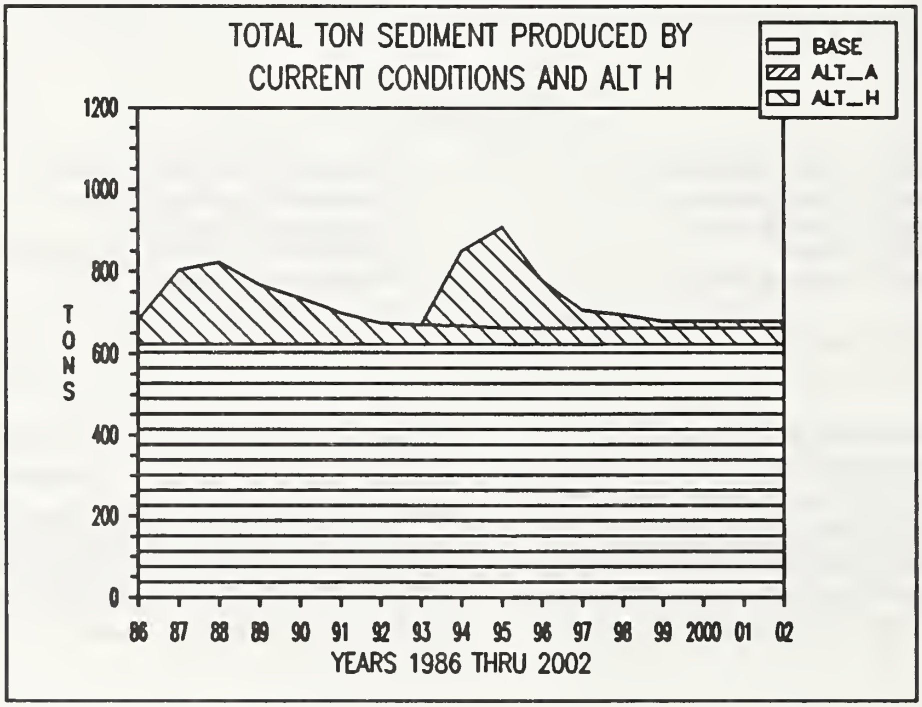


FIGURE 4-29

As can be seen in Figure 4-29, recovery is rapid in the first two years following activity. In 1994 logging activities begin and a sharp rise in sediment outputs are depicted. They then taper at a fairly constant rate to the end of the decade where they predictably approach base rate but will never quite reach base. This information was formulated using predictions from the R1R4 sediment model.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on R1R4 predictions, this alternative would have no effect on the average annual or the peak flow water yield.

Hellroaring Creek

The peak sediment yield for Hellroaring Creek, based on R1R4, is predicted to be 25 percent over base in 1994 through 1996. Sediment production would then begin to recover towards base rates and reach a stable level in 1999, four years later than would occur with Alternative A.

Based on R1R4 predictions, the current water yield and peak flow increases are six percent over natural conditions. With no action, this water yield would recover to a five percent increase in 1993. This alternative would result in increased water yield to six percent over base again, this would occur in 1995. There would not be a measurable increase in peak flow in terms of percentage.

Upper Meadow Creek

Stream surveys found the stream channel and banks to be in good condition. As discussed previously, additional data agreed with the R1R4 model predictions. This model predicted the peak sediment yield at 25 percent over base in 1995 with this alternative, the same as alternative B2.

Based on R1R4 predictions, the current water yield and peak flows are two percent over base, both would recover to one percent over base by 1996 with no further activities in the drainage. This alternative would increase the average annual water yield and peak flows to 2 percent above natural rates in 1996.

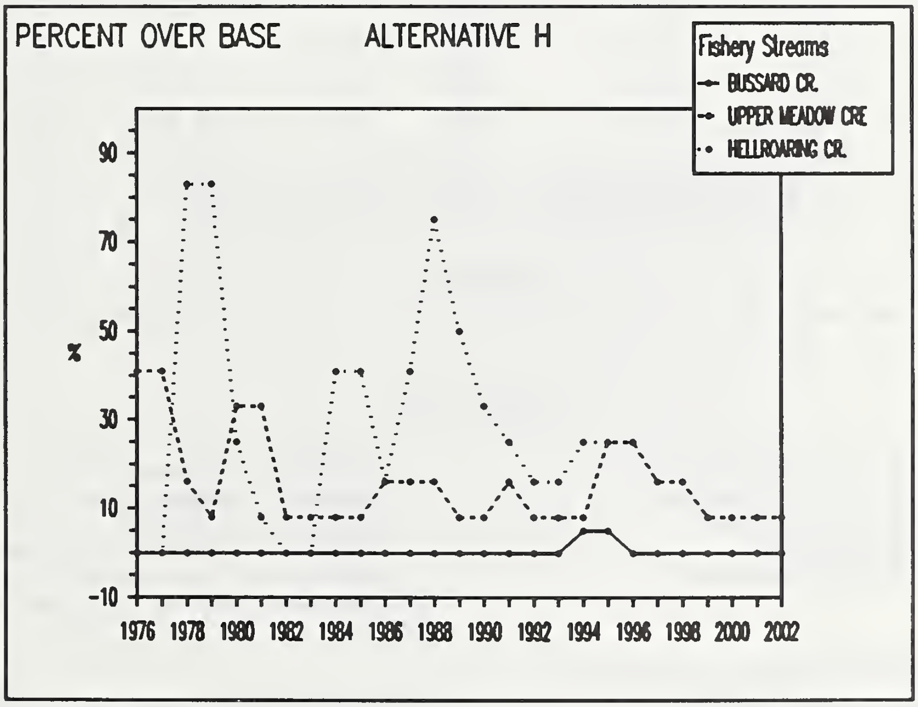


FIGURE 4-30

The above graph depicts the sediment production over base for the three drainages over time.

NON CONSUMPTIVE/NON FISHERIES STREAMS

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from no increase over existing with the Meadow Cr. Tributary, Meadow Creek, and Wall Cr. units to 127 percent over base in the Bussard Lake unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in FIGURE 4-30, sediment production in fisheries streams.

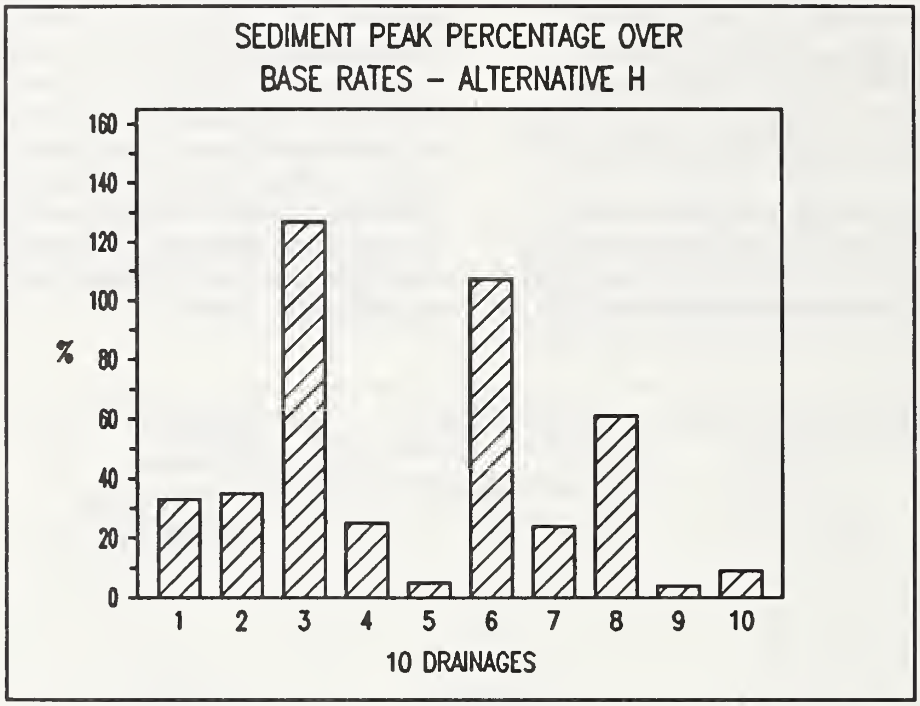


FIGURE 4-31

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on interpretation of the data presented, Bussard Creek would clearly be within Forest Plan standards and Idaho Dept. of Fish and Game fisheries objectives with this alternative.

Hellroaring Creek - Based on the further analysis for Hellroaring Creek and the forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. There would be little risk for increased bedload movement or stream channel destabilization with this alternative. Therefore this alternative should be consistent with Idaho Dept. of Fish and

Game objectives for maintaining a fisheries in Round Prairie Creek.

Upper Meadow Creek - Based on the further analysis for Upper Meadow Creek, the forest hydrologist and State Water Quality Bureau recommendations, this alternative would be consistent with Forest Plan objectives for this drainage. It would meet State of Idaho objectives for drainages feeding public water supply systems (Skille, 1990). It should also meet the objectives of the Beeline Water Association.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Given the sediment and water yield data, and the application of Best Management practices in these watersheds, Alternative H meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE I

Based on R1R4, Alternative I would result in a predicted increase of sediment production of 16 percent over base rates. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

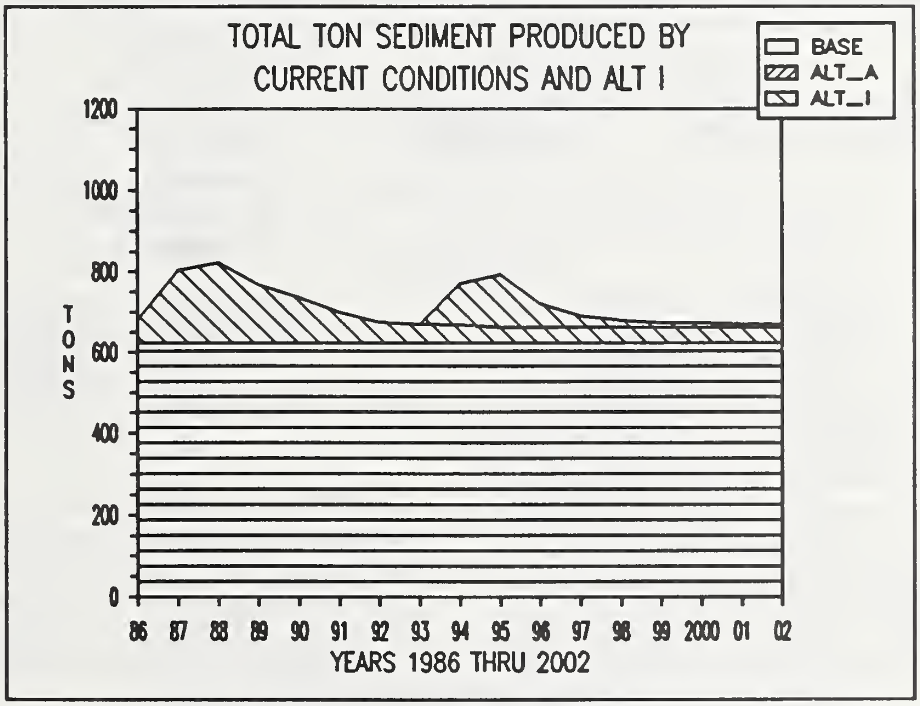


FIGURE 4-32

As can be seen in FIGURE 4-32, recovery is rapid in the first two years. In 1994 logging activities begin and a sharp rise in sediment outputs are depicted. They then taper at a fairly constant rate to the end of the decade where they predictably will approach base rate but will never quite reach base. This information was formulated using predictions from the R1R4 sediment model.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on R1R4 predictions, this alternative would have no effect on the average annual or the peak flow water yield.

Hellroaring Creek - The peak sediment yield for Hellroaring Creek, based on R1R4, is predicted to be 25 percent over base in 1994 through 1996. Sediment production would then begin to recover towards base rates and reach a stable level in 1999, four years later than would occur with Alternative A.

Based on R1R4 predictions, the current water yield and peak flow incdeases are six percent over natural conditions. With no action, this water yield would recover to a five percent increase in 1993. This alternative would not increase the water yield to above these rates. It would however, delay by two years the water yield and peak flow recovery towards base rates.

Upper Meadow Creek - Stream surveys found the stream channel and banks to be in good condition. As with other alternatives, additional data agreed with the R1R4 model predictions. This model predicted the peak sediment yield at 16 percent over base in 1995 with this alternative. This is less than the levels that the model predicted resulted from management activities that occured in 1986

Based on R1R4 predictions, the current water yield and peak flows are two percent over base. Both would recover to one percent over natural rates by 1996 if additional activities were not planned. This alternative would result in an increased water yield and peak flow to two percent again.

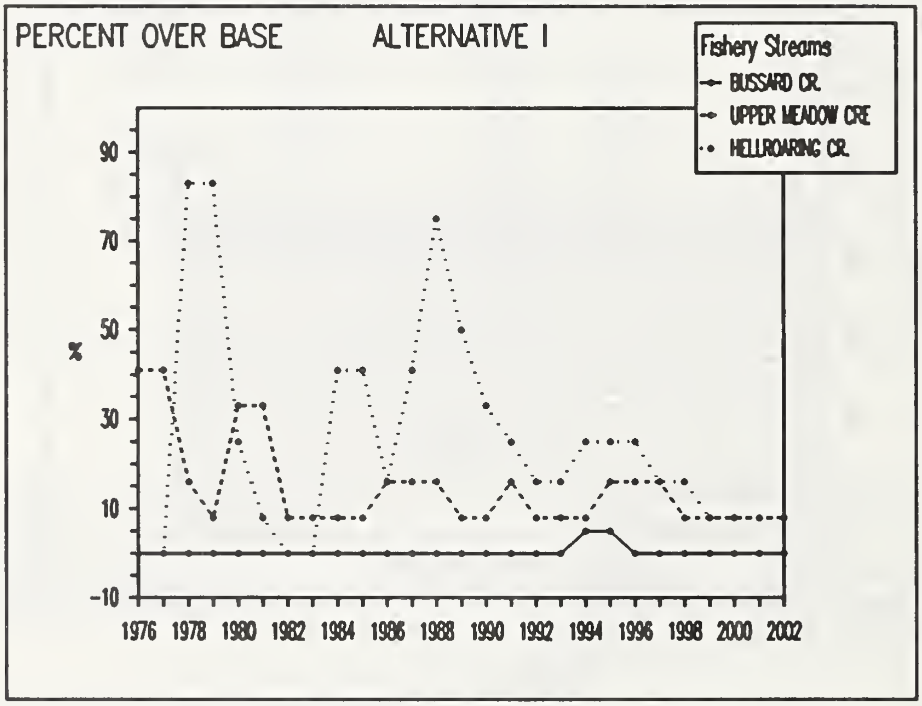


FIGURE 4-33

The above graph depicts the sediment production over base for the three drainages over time. All figures are based on R1R4 model outputs.

NON CONSUMPTIVE/NON FISHERIES STREAMS

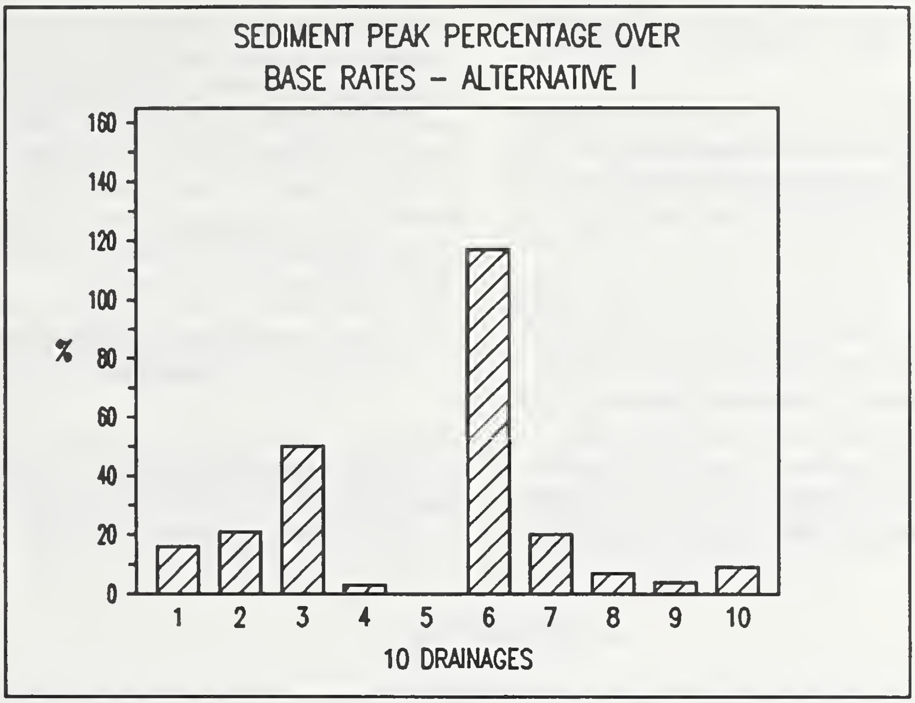


FIGURE 4-34

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from no increase over existing with the Hellroaring Ridge, Rutledge, Meadow Cr. Tributary, Meadow Cr. Face, Mcdougal Cr, and Wall Cr. units to 117 percent over base in the Rutledge Cr. Trail unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in FIGURE 4-33, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on interpretation of the analysis data, Bussard Creek would clearly be within Forest Plan standards and Idaho Dept. of Fish and Game fisheries objectives with this alternative.

Hellroaring Creek - Based on the further analysis for Hellroaring Creek and the forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. There would be little risk for increased bedload movement or stream channel destabilization. Therefore, this alternative should meet State of Idaho Dept. of Fish and Game fisheries objectives.

Upper Meadow Creek - Based on the further analysis for Upper Meadow Creek, the forest hydrologist and State Water Quality Bureau recommendations (Skille, 1990), this alternative would be consistent with Forest Plan objectives for this drainage. It would meet the State of Idaho objectives for drainages feeding public water supply systems. It should also meet the objectives of the Beeline Water Association.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Given the sediment and water yield data, and the application of Best Management practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE J1

Based on R1R4, Alternative J1 would result in a predicted increase of sediment production of 17 percent over base rates. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

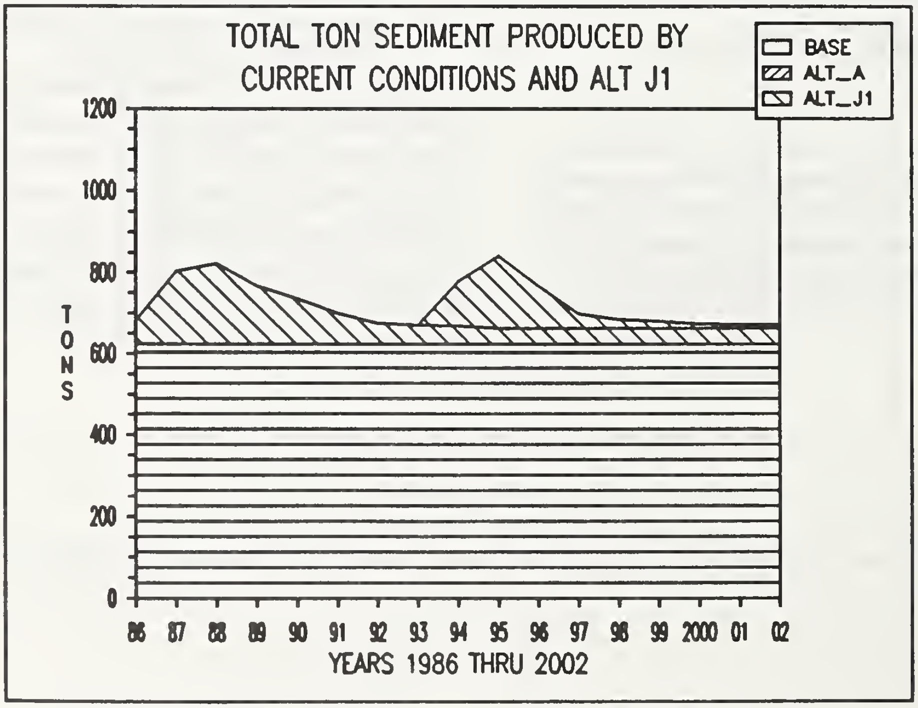


FIGURE 4-35

In 1994 logging activities begin and a sharp rise in sediment outputs are depicted. Then they taper at a fairly constant rate to the end of the decade where they predictably will approach base rate but will never quite reach base. This information was formulated using predictions from the R1R4 sediment model.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on R1R4 predictions, this alternative would increase the average annual and peak flow water yields by one percent over natural conditions.

Hellroaring Creek - The peak sediment yield for Hellroaring Creek, based on R1R4, is predicted to be 33 percent over base in 1995. Sediment production would then begin to recover towards base rates and reach a stable level in the year 2000, five years later than would occur with Alternative A.

Based on R1R4 predictions, the current water yield and peak flow increases are six percent over natural conditions. With no action, this water yield would recover to a five percent increase in 1993. This alternative would increase the average annual water yield to six percent above base in 1995. Additionaly, it would postpone by four years the peak flow recovery towards base rates.

Upper Meadow Creek - As no road construction or timber harvesting would take place in this drainage with this alternative, there would be no increase in sediment production, water yield, or peak flow. All outputs from the drainage would remain at current levels.

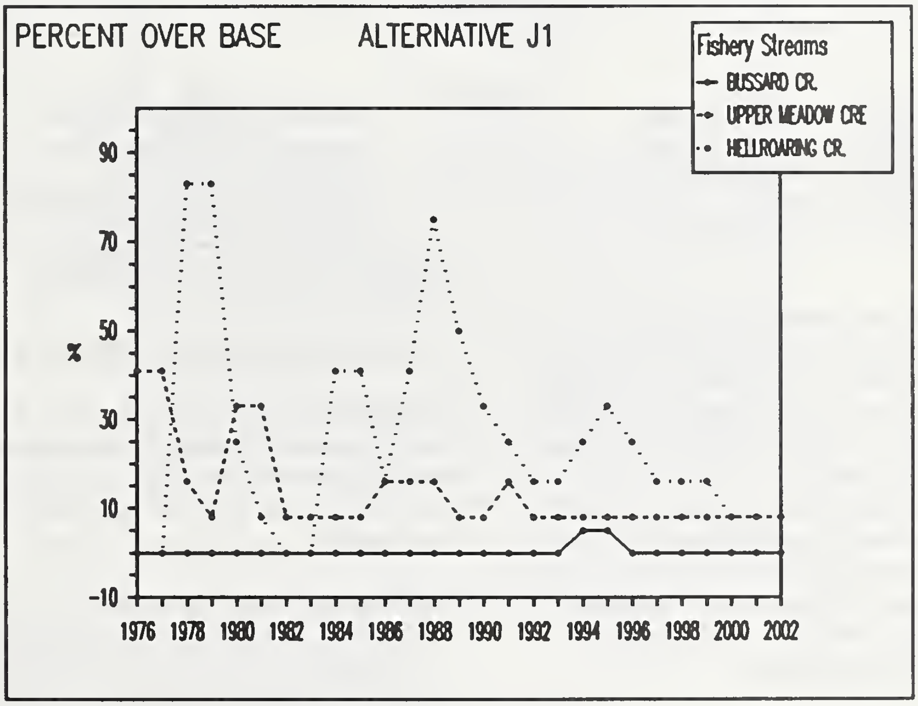


FIGURE 4-36

The above graph depicts the sediment production over base for the three drainages over time. All figures are based on R1R4 model outputs.

NON CONSUMPTIVE/NON FISHERIES STREAMS

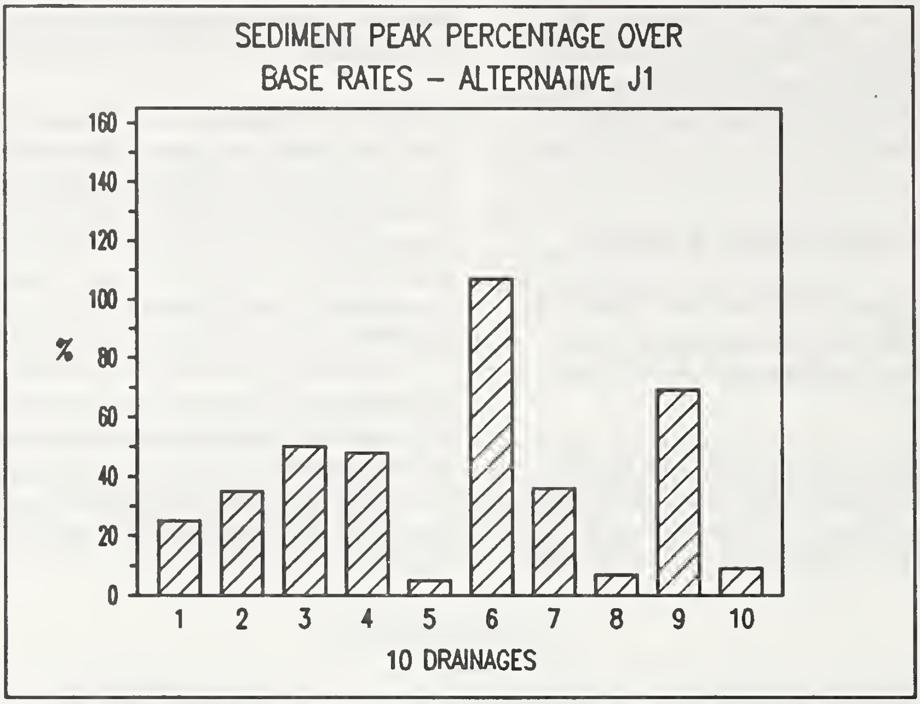


FIGURE 4-37

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from no increase over existing with the Meadow Creek and Wall Cr. units to 107 percent over base in the Rutledge Cr. Trail unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in FIGURE 4-36, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on interpretation of the data presented, Bussard Creek would clearly be within Forest Plan standards and Idaho Dept. of Fish and Game fisheries objectives with this alternative.

Hellroaring Creek - Based on the further analysis for Hellroaring Creek and the forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. There would be little risk for increased bedload movement or stream channel destabilization. Therefore this alternative should meet State of Idaho Dept. of Fish and Game objectives.

Upper Meadow Creek - Under this alternative there would be no road construction or timber harvesting within Upper Meadow Creek. As displayed earlier, this water quality from this drainage fully provides for beneficial downstream uses. Turbidity levels in the public water system are well within state standards for domestic water systems. This alternative would meet the Beeline Water Associations objectives as it would maintain existing water quality and would not result in increased maintenance costs.

Non Consumptive/Non Fisheries Streams

Given the sediment and water yield data, and the application of Best Management Practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE J2

Based on R1R4, Alternative J2 would result in a predicted increase of sediment production of 18 percent over base rates. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

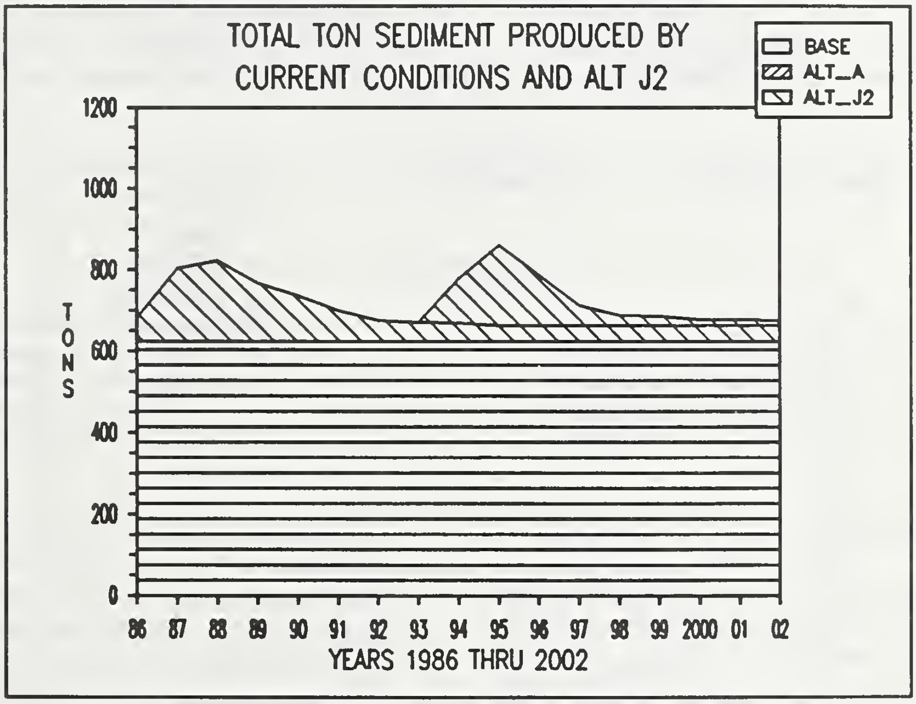


FIGURE 4-38

As can be seen in Figure 4-38, recovery is rapid in the first two years. In 1994 logging activities begin and a sharp rise in sediment outputs are depicted. They then taper at a fairly constant rate to the end of the decade where they predictably will approach base rate but will never quite reach base. This information was formulated using predictions from the R1R4 sediment model.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on R1R4 predictions, this alternative would increase the average annual and peak flow water yields by one percent over natural conditions.

Hellroaring Creek - The peak sediment yield for Hellroaring Creek, based on R1R4, is predicted to be 33 percent over base in 1995. Sediment production would then begin to recover towards base rates and reach a stable level in 2000, five years later than would occur with Alternative A.

Based on R1R4 predictions, the current water yield and peak flow increases are six percent over natural conditions. With no action, this water yield would recover to a five percent increase in 1993. This alternative would increase the average annual water yield to six percent above base in 1995. Additionally, it would delay by four years the peak flow recovery towards base rates.

Upper Meadow Creek - Stream surveys found the stream channel and banks to be in good condition. As previously presented, additional data agreed with the R1R4 model predictions. This model predicted the peak sediment yield at 16 percent over base in 1995 with this alternative.

Based on R1R4 predictions, the current water yield and peak flows are two percent over base. Both would recover to one percent over natural rates by 1996. This alternative would result in an increase in both to two percent over natural rates.

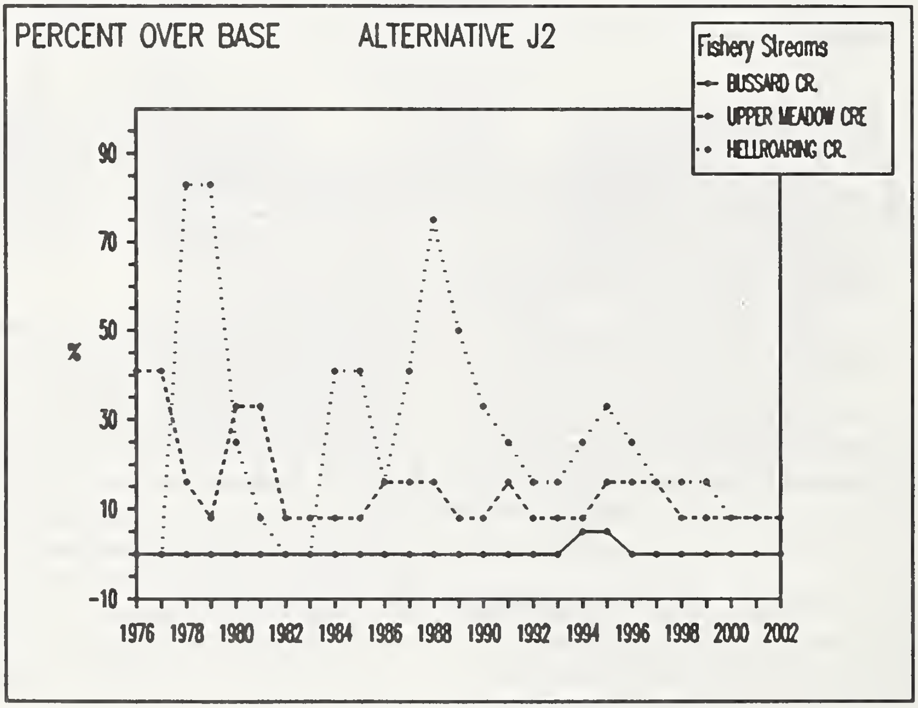


FIGURE 4-39

The above graph depicts the sediment production over base for the three drainages over time. All figures are based on R1R4 model outputs.

NON CONSUMPTIVE/NON FISHERIES STREAMS

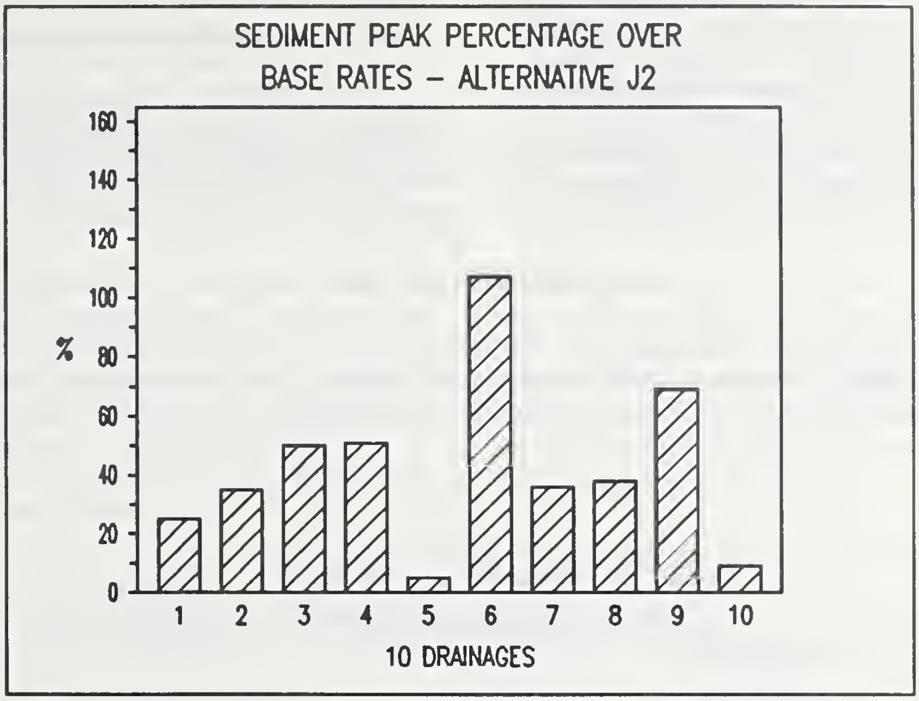


FIGURE 4-40

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

R1R4 predicts that the sediment production in these drainages would increase. This total sediment production would range from no increase over existing with the Meadow Creek unit to 107 percent over base in the Rutledge Cr. Trail unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in FIGURE 4-39, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek - Based on interpretation of the data presented, Bussard Creek would clearly be within Forest Plan standards and State of Idaho Department of Fish and Game fisheries objectives.

Hellroaring Creek - Based on the further analysis for Hellroaring Creek and the forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. The risk would be low for increased bedload movement or stream channel destabilization. Therefore this alternative should be consistent with Idaho Fish and Game objectives of maintaining a fisheries in Round Prairie Creek.

Upper Meadow Creek - Based on the further analysis for Upper Meadow Creek, the forest hydrologist and State Water Quality Bureau recommendations (Skille, 1990), this alternative is consistent with Forest Plan objectives. It would not cause a reduction in fisheries habitat in Meadow Creek to below the Forest Plan standards. In addition, it would be within the State of Idaho proposed turbidity standards for drainages feeding public water supply systems. Therefore this alternative should also be consistent with Beeline Water Association objectives.

Non Consumptive/Non Fisheries Streams

Given the sediment and water yield data, and the application of Best Management Practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE J2H

Based on R1R4, alternative J2H would result in a predicted increase of sediment production of 19 percent over base rates. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

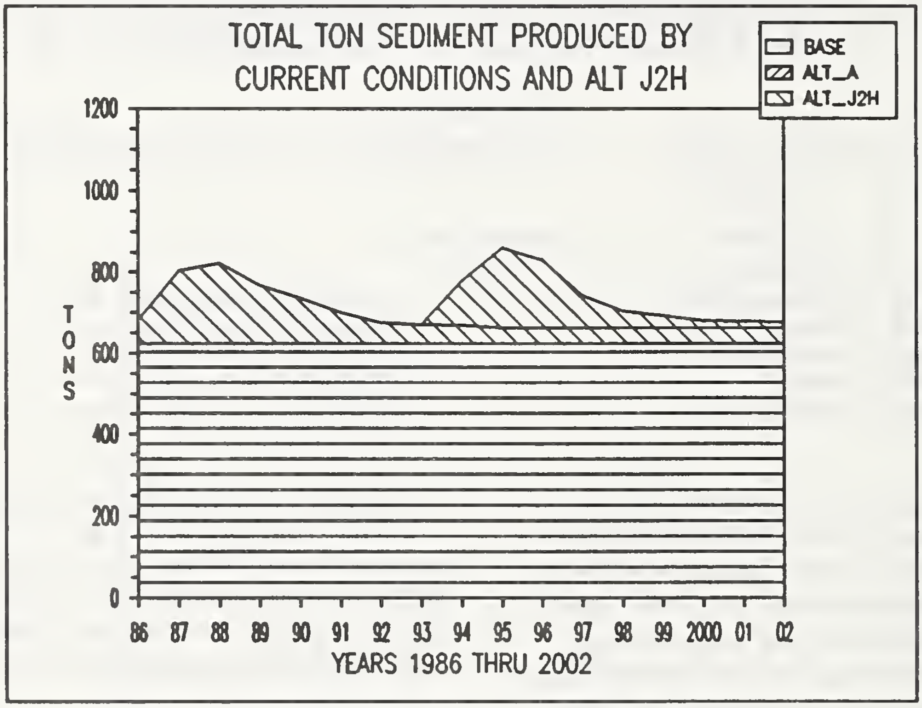


FIGURE 4-41

In 1994 logging activities begin and a sharp rise in sediment outputs are depicted. They then taper at a fairly constant rate to the end of the decade where they predictably will approach base rate but will never quite reach base. This information was formulated using predictions from the R1R4 sediment model.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on R1R4 predictions, this alternative would increase the average annual and the peak flow water yields to one percent over natural conditions

Hellroaring Creek

The effect of this alternative on Hellroaring Creek is the same as Alternative J2. The peak sediment yield for Hellroaring Creek, based on R1R4, is predicted to be 33 percent over base in 1995. Sediment production would then begin to recover towards base rates and reach a stable level in 2000, five years later than would occur with Alternative A.

Based on R1R4 predictions, the current water yield and peak flow increases are six percent over natural conditions. With no action, this water yield would recover to a five percent increase in 1993. This alternative would increase the average annual water yield to six percent above base in 1995. Additionaly, it would delay by four years the peak flow recovery towards base rates.

Upper Meadow Creek

Stream surveys found the stream channel and banks to be in good condition. As with other alternatives, additional data agreed with the R1R4 model predictions. This model predicted the peak sediment yield at 16 percent over base in 1995 with this alternative. This is less than the levels predicted by the model that resulted from management activities that occured in 1986.

Based on R1R4 predictions, the current water yield and peak flows are two percent over base. Both would recover to one percent over natural rates by 1996 if additional activities were not planned. This alternative would result in a two percent increase over natural rates for both annual water yield and peak flows.

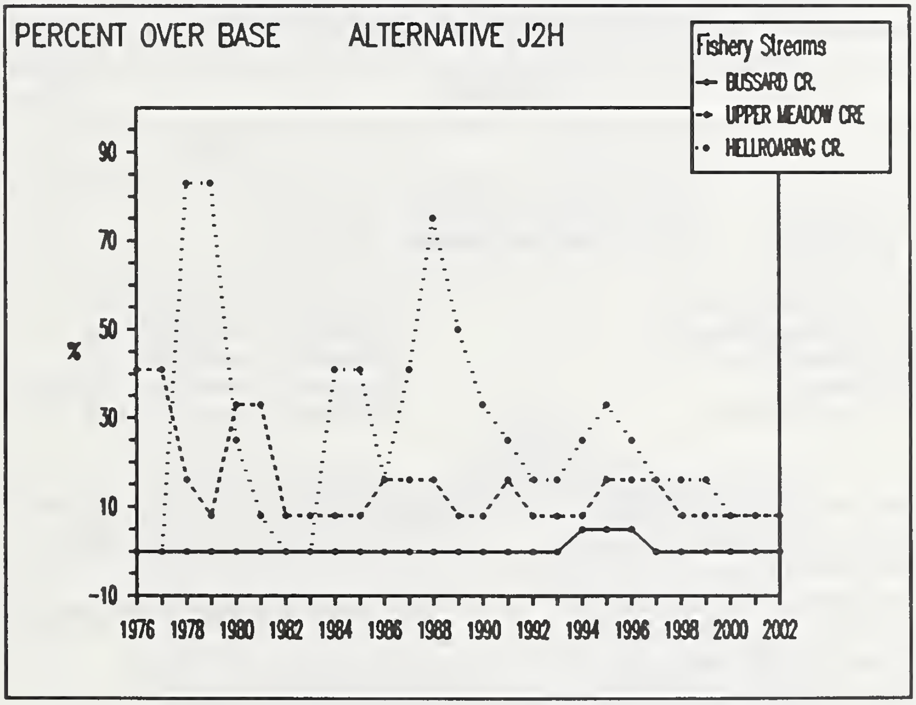


FIGURE 4-42

The above graph depicts the sediment production over base for the three drainages over time. All figures are based on R1R4 model outputs.

NON CONSUMPTIVE/NON FISHERIES STREAMS

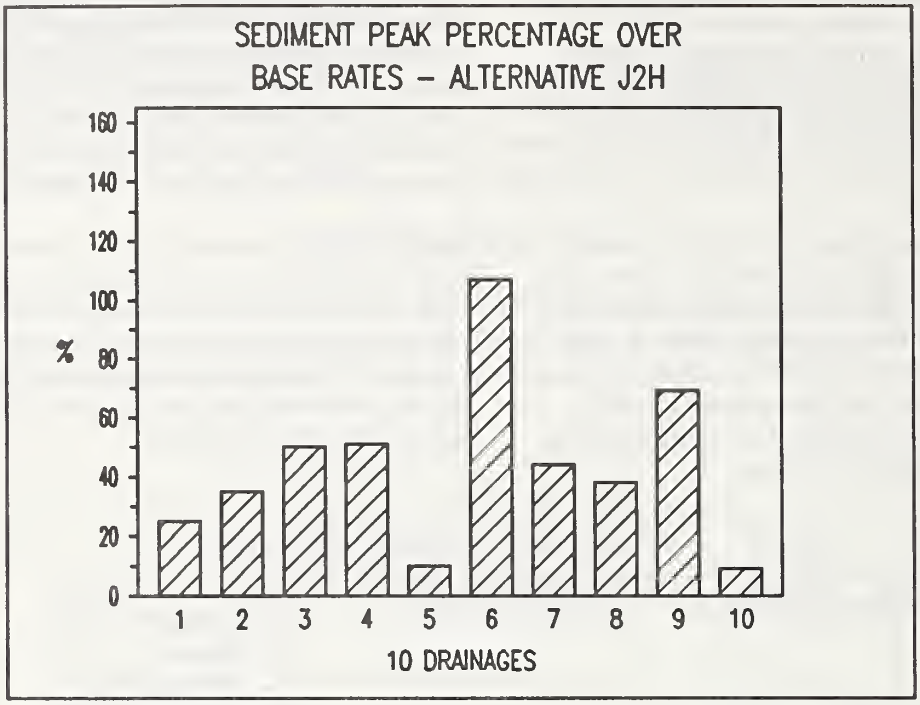


FIGURE 4-43

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Tributaries
DRAINAGE 10 - Meadow Creek

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from no increase over existing with the Meadow Creek unit to 107 percent over base in the Rutledge Cr. Trail unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in FIGURE 4-42, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on interpretation of the data presented, Bussard Creek would clearly be within Forest Plan standards and Idaho Fish and Game fisheries objectives.

Hellroaring Creek

Based on the further analysis for Hellroaring Creek and the forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. There would be little risk of increased bedload movement or stream channel destabilization. Therefore this alternative should be consistent with Idaho Fish and Game objectives to maintain a fisheries in Round Prairie Creek.

Upper Meadow Creek

Based on the further analysis for Upper Meadow Creek, the forest hydrologist and State Water Quality Bureau recommendations (Skille, 1990), this alternative is consistent with Forest Plan objectives for this drainage. It would not cause a reduction in fisheries habitat in Meadow Creek to a level below the Forest Plan standards. In addition, it would be within the State of Idaho standards for drainages feeding public water supply systems. Therefore this alternative should also be consistent with Beeline Water Association objectives.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Given the sediment and water yield data, and the application of Best Management Practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

ALTERNATIVE K

Based on R1R4, Alternative K would result in a predicted increase of sediment production of 19 percent over base rates. This is for the same seventeen year period, 1986 to 2002, as displayed in Alternative A. It includes those activities within the Decision Area that took place in the previous decades and are now showing recovery.

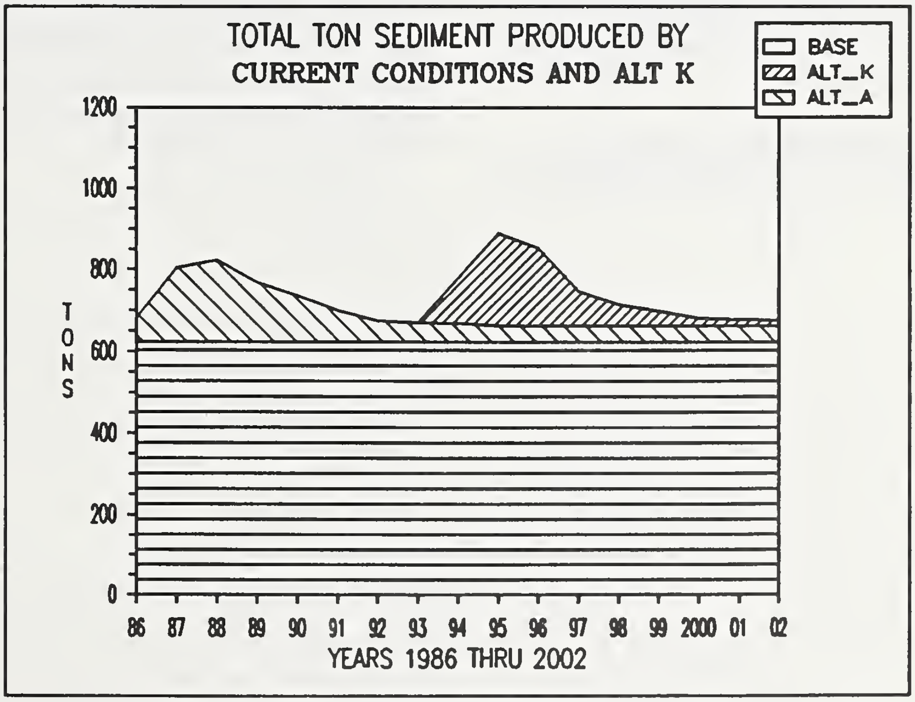


FIGURE 4-44

In 1994 logging activities begin and a sharp rise in sediment outputs are depicted. They then taper at a fairly constant rate to the end of the decade where they predictably will approach base rate but will never quite reach base. This information was formulated using predictions from the R1R4 sediment model.

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on R1R4 predictions, this alternative would have no effect on the average annual water yield. The peak flow would increase to one percent over natural rates. It would recover to natural rates in five years.

Hellroaring Creek

The peak sediment yield for Hellroaring Creek, based on R1R4, is predicted to be 33 percent over base in 1995. Sediment production would then begin to recover towards base rates and reach a stable level in 2000, five years later than would occur with Alternative A.

Based on R1R4 predictions, the current water yield and peak flow increases are six percent over natural conditions. With no action, peak flow would recover to five percent over natural rates in 1995 and four percent in 1998. There would be a corresponding recovery in the annual water yield increase. This alternative would postpone by two years the recovery time for water yield and peak flow increases. It would not however, increase the average annual water yield or peak flow above existing levels.

Upper Meadow Creek

Stream surveys found the stream channel and banks to be in good condition. As with other alternatives, additional data agreed with the R1R4 model predictions. This model predicted the peak sediment yield at 25 percent over base in 1995 with this alternative. This is the same as the levels predicted by the model that resulted from management activities that occured in 1986.

Based on R1R4 predictions, the current water yield and peak flows are two percent over base. Both would recover to one percent over natural rates by 1996 if additional activities were not planned. This alternative would result in a two percent increase over natural rates for both annual water yield and peak flows.

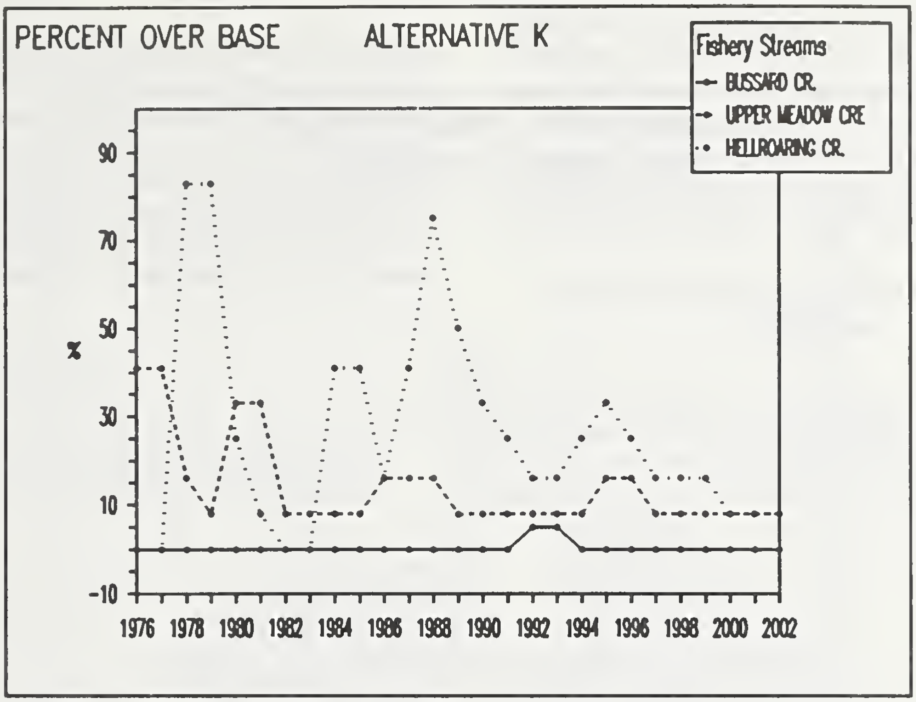


FIGURE 4-45

The above graph depicts the sediment production over base for the three drainages over time. All figures are based on R1R4 model outputs.

NON CONSUMPTIVE/NON FISHERIES STREAMS

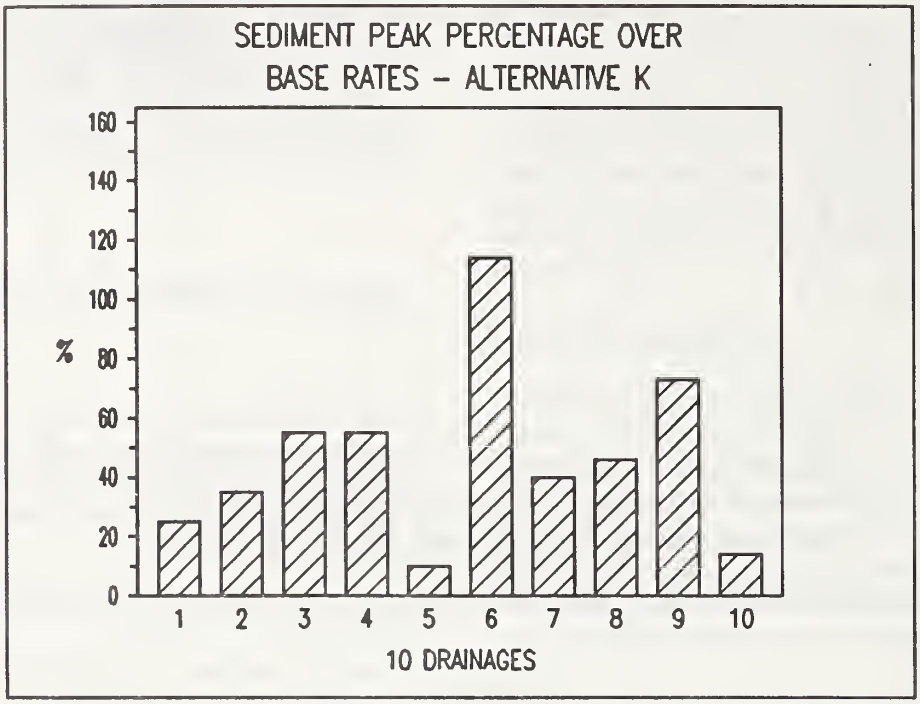


FIGURE 4-46

DRAINAGE 1 - Hellroaring Ridge
DRAINAGE 2 - Little Hellroaring Cr
DRAINAGE 3 - Bussard Lake
DRAINAGE 4 - Snyder
DRAINAGE 5 - Rutledge Creek
DRAINAGE 6 - Rutledge Cr Trail
DRAINAGE 7 - McDougal Creek
DRAINAGE 8 - Wall Creek
DRAINAGE 9 - Meadow Cr Ttibutaries
DRAINAGE 10 - Meadow Creek

R1R4 predicts that the sediment production in these drainages would increase with the activities of this alternative. This total sediment production would range from ten percent increase over natural rates in Rutledge Creek unit to 114 percent over base in the Rutledge Cr. Trail unit. The increases in sediment yield all recover within two to three years and begin to approach the base line in five to six years. This recovery in sediment production is similar in time to the expected recovery displayed in FIGURE 4-45, sediment production in fisheries streams.

CONSISTENCY WITH FOREST PLAN AND OTHER AGENCIES OBJECTIVES

CONSUMPTIVE AND FISHERIES STREAMS

Bussard Creek

Based on interpretation of the data presented, Bussard Creek would clearly be within Forest Plan standards and Idaho Fish and Game fisheries objectives.

Hellroaring Creek

Based on the further analysis for Hellroaring Creek and the forest hydrologist's and fisheries biologist's recommendations, this alternative meets Forest Plan objectives for the drainage. There would be little risk of increased bedload movement or stream channel destabilization. Therefore this alternative should be consistent with Idaho Fish and Game objectives to maintain a fisheries in Round Prairie Creek.

Upper Meadow Creek

Based on the further analysis for Upper Meadow Creek, the forest hydrologist and State Water Quality Bureau recommendations (Skille, 1990), this alternative is consistent with Forest Plan objectives for this drainage. It would not cause a reduction in fisheries habitat in Meadow Creek to a level below the Forest Plan standards. In addition, it would be within the State of Idaho standards for drainages feeding public water supply systems. Therefore this alternative should also be consistent with Beeline Water Association objectives.

NON CONSUMPTIVE/NON FISHERIES STREAMS

Given the sediment and water yield data, and the application of Best Management Practices in these watersheds, this alternative meets Forest Plan objectives for non fisheries streams.

INTRODUCTION

Disturbances caused by the construction of roads and the harvest of trees has an impact on visual quality. This impact is caused by contrasts created between the natural forest landscapes and managed landscapes. These contrasts consist of changes in form, line, color, and texture of the soil and vegetation. In the Pacific Northwest, changes in landscapes caused by timber management are usually more noticable due to dominance of form and line. Previous human activity, from settlement patterns to more recent timber harvest, has affected the visual quality of the Decision Area in varying degrees.

Several people who responded to the DEIS stated concerns over the impact of clearcutting. Others expressed concerns also with sparse seed tree cutting. Visual effects generated by timber harvest and associated activities vary in duration and intensity according to the timber cover left on the site after logging. Clearcutting and seed tree harvesting leave less than 15 percent cover on a harvest unit. These harvest types can create the strongest contrast between natural and managed landscapes depending on viewer position, slope steepness, season, and the position of units on the slope.

Shelterwood harvesting leaves approximately 30 percent cover and is somewhat less noticable than clearcuts or seedtrees. Both seedtree units and shelterwood units will look like six to ten year old clearcuts if the overstory is removed when commonly done. When modified to maintain a higher visual quality, approximately 15 trees per acre are left on seedtree and shelterwood harvest units until the first commercial thinning. This modification helps this harvest technique to appear more natural.

Sanitation salvage, thinning, and uneven-age management are some of the least impactive harvesting; leaving 50 percent or more cover on the harvested area.

The dominance of management activities, i.e. timber harvest, must be identified to determine if adopted Visual Quality Objectives (VQO's) will be met with the activities. If activities are designed to repeat form, line, color, and texture common to the characteristic landscape to a degree that changes in these characteristics are not evident to the casual forest visitor a VQO of Retention would be achieved. If these changes are evident, but remain subordinate to the characteristic landscape, a VQO of Partial Retention would be met. If changes in the characteristics dominate the landscape, but borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area a VQO of Modification would be achieved.

The harvest prescription of a particular harvest unit will influence the potential dominance of the unit, but will not by itself determine the degree of contrast created by the harvesting. More important is how the harvesting fits with the natural landscape in regard to scale, line and shape. Sensitivity of potential viewers is also important, but a difficult variable to measure. Harvest units that do not dominate the landscape for casual forest visitors may dominate the view for viewers that are more familiar with the area affected. Adopted VQO's were designed with the casual forest visitor in mind. A harvesting unit that dominates the view for some viewers may still meet a VQO that calls for management activities to not be evident or subordinate to the characteristic landscape.

The computer graphics on the following pages demonstrate the visual differences between clearcutting and other harvest methods when applied to the same landscape. Alternative B2, page 4-77 figure 4-53, demonstrates the impact of clearcutting on the view from the Moyie River; Alternative D, page 4-80 figure 4-59, demonstrates the effect of basal area thinning on the same view; Alternative H, page 4-86 figure 4-70, demonstrates the effect of shelterwood harvesting on the same view.

The longest lasting visual disturbance is caused by soil disturbance from road construction and tractor or cable logging. Opportunities to minimize visual impacts are greatest on tractor ground. This is because unit size, shape, and silvicultural prescription can be manipulated more effectively to screen disturbances.

The analysis to determine the existing visual quality and the expected visual quality resulting from the alternatives was conducted as follows:

1. The acreage of harvesting is displayed by the amount of remaining cover, i.e. 0% to 15%, 16% to 30%, 31% to 50%, and 50%+.

2. Visual Condition Classes (VCC) were determined by plotting roads and existing and proposed timber harvesting on a map and applying the definitions of VCC's to the expected appearance. Differences in amount of harvest and harvest prescription were considered and influenced the determination of expected appearance.

3. A Hewlett-Packard 9000 series computer was used to develop a digital terrain model of the Decision Area. By tracing contour lines from a topographic base map, the model builds a grid of elevation points from the selected points fed into the computer. The appearance of proposed timber harvesting activities on the landscape can then be simulated by the computer.

The model depicts the appearance of harvest units as viewed from specific viewpoints identified by the model user. Proposed harvesting was depicted by the model from viewpoints identified through reconnaissance of the Decision Area (see Figure 3-6, page 3-27).

The model does have limitations so the drawings may not appear precisely as the landscape appears to the viewer. The limitations are mainly noticeable in the partial cut simulations and are due to the limited number of timber types that can be entered into the computer program for any one view. The model also will simulate only a given number of trees per acre. The forest canopy simulation for some viewing distances and slopes will not be depicted as densely as actually exists. Likewise, seed tree and shelterwood harvested units may be drawn with less reserve trees than actually planned to demonstrate the contrast that would be created between the uncut timber stands and the unit.

Neither does the model depict color differences due to soil disturbance, seasonal conditions, or species selection. Fine detail such as crown damage in residual timber, slash, or complex structural shapes and textures cannot be shown by the model. The drawings should be used as a method to compare the existing conditions and the alternatives.

DURATION OF EFFECTS

The lifespan of timber harvest and road building disturbances is long enough that the effects of previous harvesting activities within the Decision Area are still noticeable. These past disturbances and the proposed activities will have a cumulative effect on the resource.

The viewpoints available will change over time. This will be caused by vegetation growing along the major travel routes identified as viewpoints in Chapter 3. As this vegetation grows, views will be lost. When vegetation is manipulated, new views will be created.

Timber harvest activities effects on the visual resource can also be changed by the seasonal variations in vegetation condition and seasonal color contrast. View points that exist in winter months when deciduous trees have shed their leaves, will not exist in summer months when thick foliage can block the view. Changes in autumn color patterns draw attention to harvest areas that may not contain the same colors as surrounding unmanaged timber stands. This is especially true in western larch stands. Harvest units with less than 30 percent timber cover attract attention when covered with snow in winter months. Harvest units that are not noticeable other times of the year can dominate a landscape during the winter months.

Disturbances to vegetation and soil begin to heal immediately. The duration of this process is directly related to the extent of disturbance. In two or three years, herbaceous vegetation covers most disturbed sites within the Decision Area if additional disturbances are not allowed. Within 25 to 30 years, or 30 to 35 years for areas viewed during winter months, tree cover will grow to the point where the visual impact will be generally unnoticed.

While harvest units over time will recover to an "Unnoticed" and possibly an "Untouched" VCC, even low standard local roads will remain noticeable. Because of this, disturbance from all past roading will continue to impact the visual resource.

Photo of Meadow Creek rail road station in 1926 looking at the south west corner of the Decision Area. Note evidence of past fires.

EFFECTS COMMON TO ALL ALTERNATIVES

The proposed construction of a new gas line adjacent to the existing Pacific Gas Transmission Company's gas line along the Moyie River is a reasonably foreseeable future action. The construction corridor is located within the foreground viewing area of the Moyie River, Highway 95, and the Meadow Creek Road. This activity is expected to occur during the same time period that activities associated with the proposed action are scheduled. It would have a cumulative impact to the visual quality within the Moyie River corridor.

The effect of the pipeline construction action would be most evident during the construction phase of the gas line. The equipment and earth movement required for this project would be an impact to the visual quality of the area. The growth of herbaceous vegetation on the disturbed soil should help reduce the impact of the disturbance in two to three years. Longer term effects of the pipeline construction would be the increased clearing width of the corridor that is cut through the valley-bottom timber.

Perspective plot drawings of the existing timber harvesting units and units proposed by the action alternatives were prepared. These computer simulations show the part of the harvest unit that would be visible from specific viewpoints. They do not show the peripheral timber or individual trees left uncut within units. Drawings are in the project file and are available for review upon request.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

In addition to the proposed action, reasonably foreseeable actions which are common to all action alternatives include: salvage harvest; overstory removal on existing seedtree and shelterwood harvested units; firewood cutting; and continued limited mining exploration. These activities are projected to take place from existing roads. Their effects would normally, disregarding catastrophic occurances, be incidental compared with any of the alternatives. In addition, future road construction and timber harvesting will likely occur before the impacts of the proposed action on visual quality have recovered to the point of not being noticeable. The effects of such actions would have a cumulative effect on the visual quality of the Decision Area.

The same view taken from from railroad crossing at Meadow Creek townsite in January, 1990. Note change in vegetation.

VISUAL QUALITY EFFECTS BY ALTERNATIVE

ALTERNATIVE A

Since the current activities under this alternative were taken into account while assessing the existing Visual Condition Classes (Chapter 3, page 3-29), there would not be a negative effect on the visual resource. A positive effect of this alternative is the time it allows for the visual recovery of the existing situation. However, it does not provide the opportunity to implement vegetative manipulation measures that would soften the straight line edge effect of existing harvest units in Hellroaring Creek.

Photo of Hellroaring Creek existing conditions from viewpoint 14

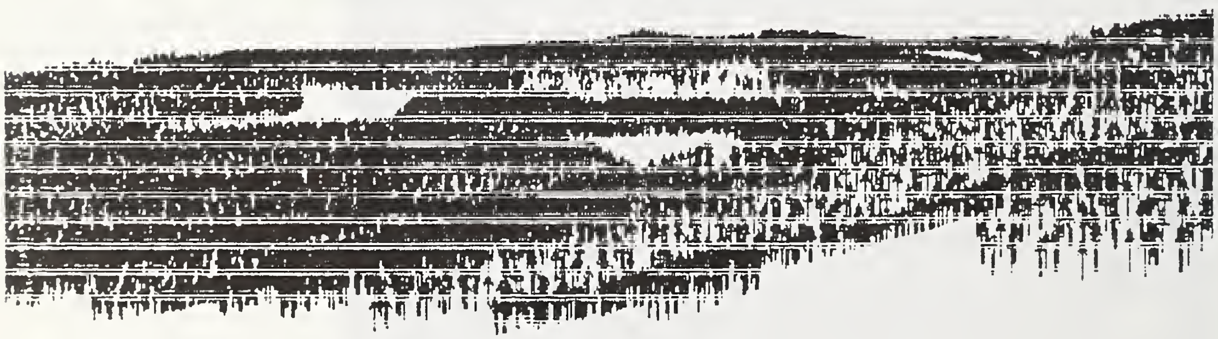


FIGURE 4-47 Computer drawing of Hellroaring Creek existing conditions from viewpoint 14

The preceding partial cut depiction of existing units in Hellroaring Creek displays the existing or planned timber harvesting units as seen from viewpoint 14, along Highway 95. The existing

condition of visual quality in this portion of the Decision Area, as seen from Highway 95, is not consistent with the Forest Plan visual quality objectives. Photos taken from the same viewpoint display the accuracy of the model used. All timber harvest units, except the seedtree unit in the center of the photograph, have been completed. When completed, the seed tree unit will appear similar to that displayed by the computer model.

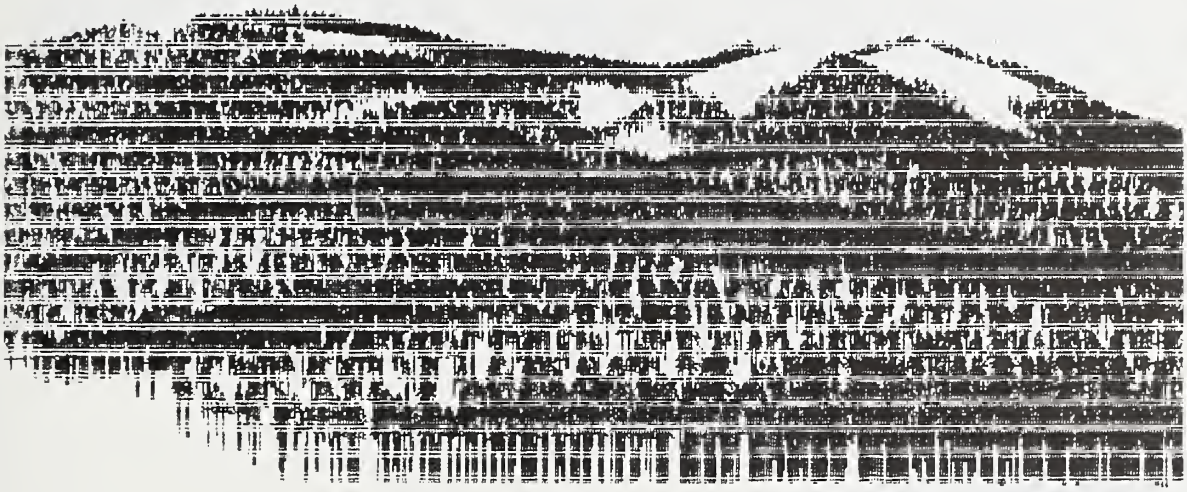


FIGURE 4-48 Partial cut depiction from Viewpoint 3

The above partial cut depiction from viewpoint 3 displays a view looking west from the Moyie River in the southern end of the Decision Area. There are no timber harvesting activities presently visible in this view, the openings in the canopy are natural occurrences. The effects of timber harvesting on this same view will be depicted for each of the action alternatives.

Photo from viewpoint 4

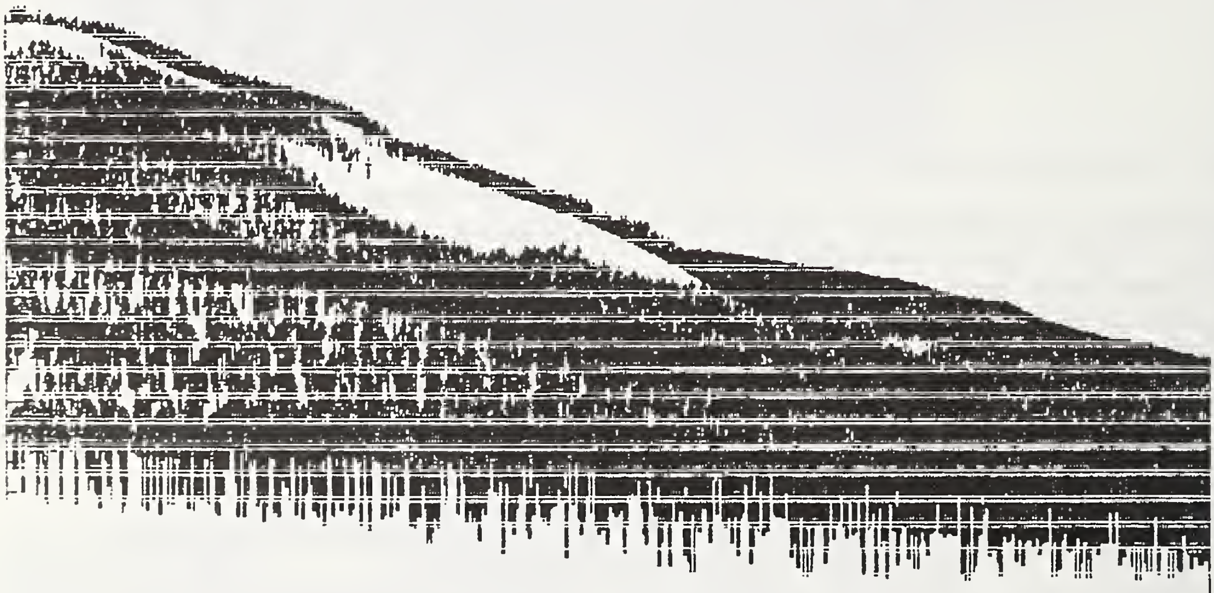


FIGURE 4-49 Partial cut depiction from viewpoint 4

The above photo and partial cut depiction from viewpoint 4 represent a view looking northwest from the Meadow Creek road just north of viewpoint 3. The effects of timber harvesting on this same view will be depicted for each of the action alternatives.

Photo from viewpoint 7

FIGURE 4-50 Partial cut depiction from viewpoint 7

The above photo and partial cut depiction from viewpoint 7 represent a view looking southwest from the Moyie River in the vicinity of Sinclair Lake. As with above photos and computer depictions, no previous timber management activities are present. The effects of timber harvesting on this same view will be depicted for each of the action alternatives.

ALTERNATIVE B2

This alternative adds 1,305 acres of timber harvesting to the landscape that leaves 15 percent or less cover on harvested areas. It also adds 985 acres of harvesting that leaves 51 percent or more canopy cover. There are several thousand acres within the Decision Area that would not be treated with timber harvest. However, the visual magnitude of this action alternative would result in strong changes that would be obvious to anyone from most points within or around the Decision Area. The result of this is a reduction in the Untouched VCC from 8,571 acres to 0 acres and an increase in the Major Disturbance VCC from 6,175 acres to 13,320 acres. There would be an area of 1,496 acres that will not be visually impacted. This would be located in upper Bussard Creek, where no management activities will take place. As less than 5,000 acres of this class would exist, it was all considered as Unnoticed VCC.

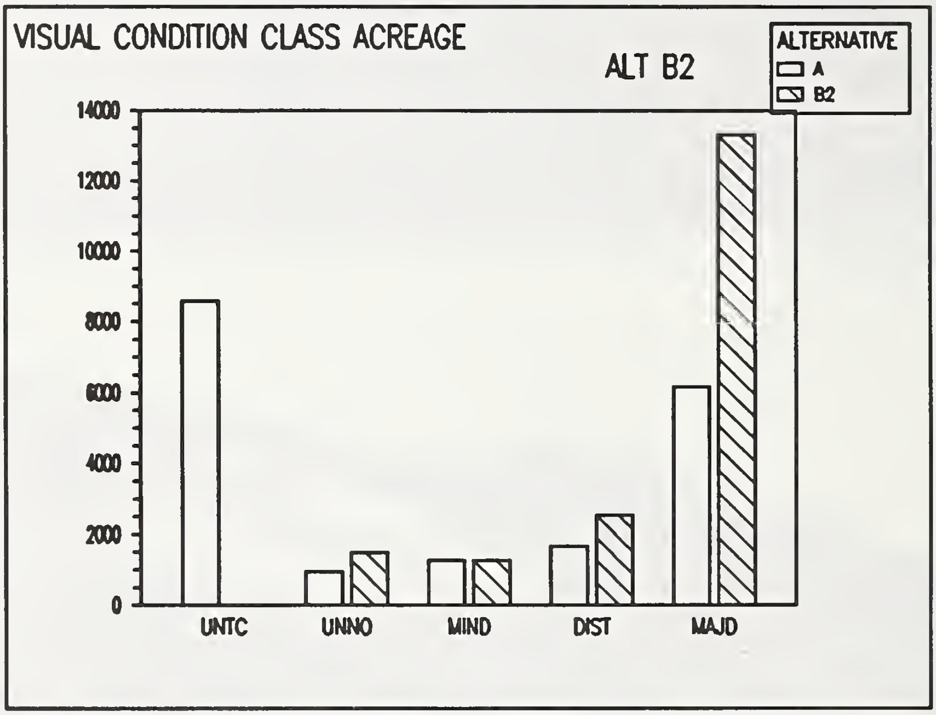


FIGURE 4-51

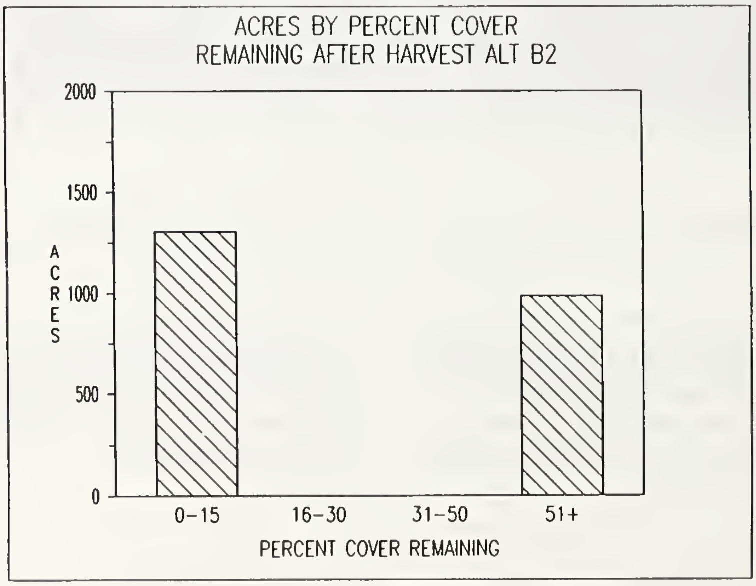


FIGURE 4-52

CONSISTENCY WITH THE FOREST PLAN: This action is not consistent with the Forest Plan. It does not meet Forest Plan adopted Visual Quality Objectives.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS: Computer graphics are shown for effects from viewpoints 3, 4, 7, and 14.

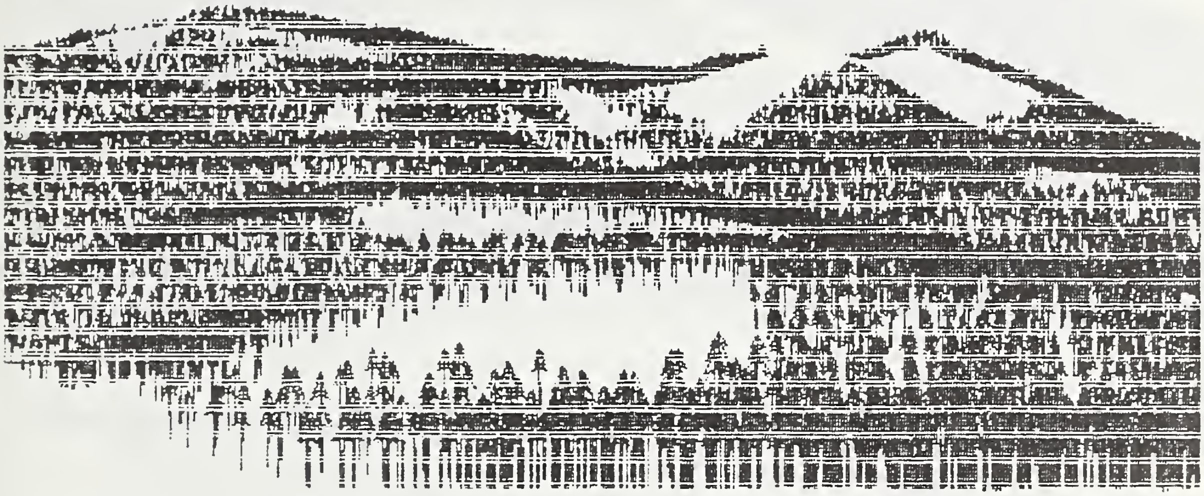


FIGURE 4-53 Foreground clearcuts (units 11 and 12) and background clearcut (unit 8) on the upper left skyline as seen from viewpoint 3.

FIGURE 4-54 Portion of Decision Area as viewed from viewpoint 4. Shows addition of one seedtree unit (unit 13) and one clearcut (unit 14) to the foreground. It also shows the addition of one clearcut (unit 27) and one seedtree unit (unit 30) to the background.

FIGURE 4-55 Above partial cut depiction from viewpoint 7, shows the addition of two clearcutting units (units 34 and 35) to the foreground.

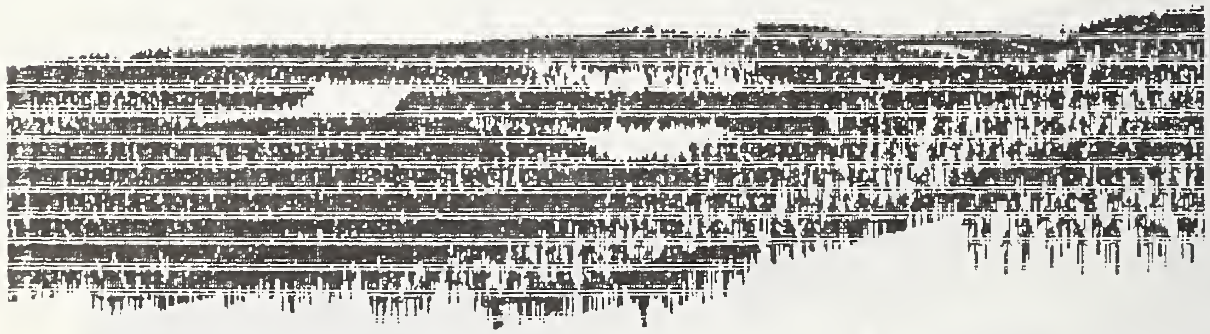


FIGURE 4-56 Above partial cut depiction from viewpoint 14 shows the change added above the existing seed tree harvest unit in the upper center of the drawing. The visible change would be the removal of approximately 50 percent of the Basal Area in units (unit 129) and the cutting of skyline corridors through the unit. This view is the same for Alternatives B2, D, E, EH, H, and I. It will not be repeated for the other alternatives.

ALTERNATIVE D

This alternative would add 105 acres of timber harvesting to the landscape that leaves 15 to 30 percent cover on the harvested area. It would also add 1,840 acres of harvesting that leaves 51 percent or more canopy cover. The result of this harvesting would be a decrease in the Untouched VCC from 8,571 acres to 5,015 acres. The VCC of Unnoticed would increase from 950 acres to 1,919 acres and the VCC of Minor Disturbance would increase from 1,265 acres to 3,852 acres.

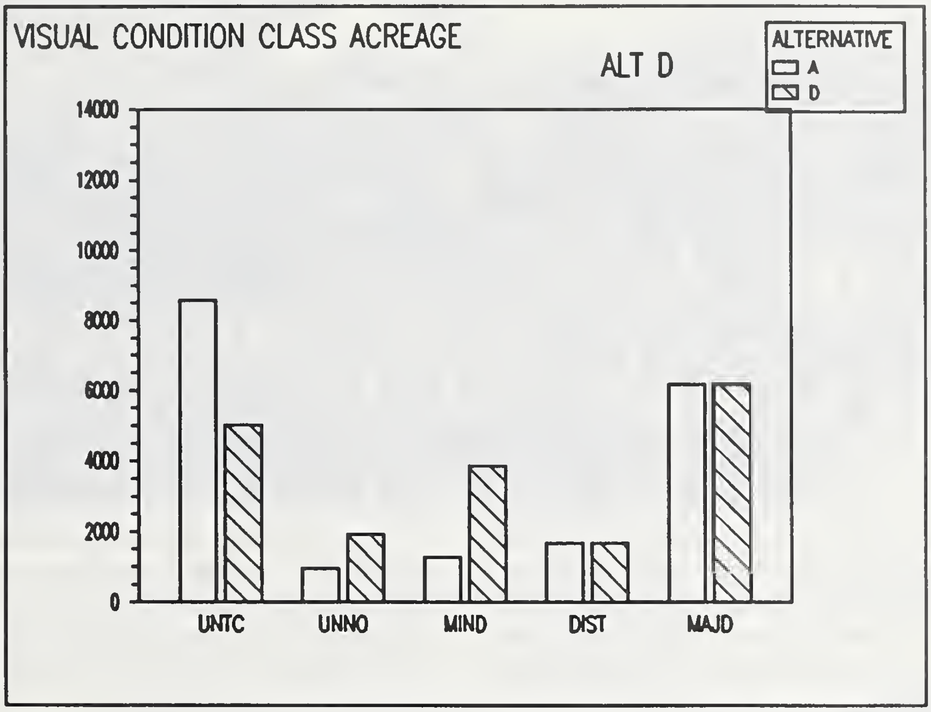


FIGURE 4-57

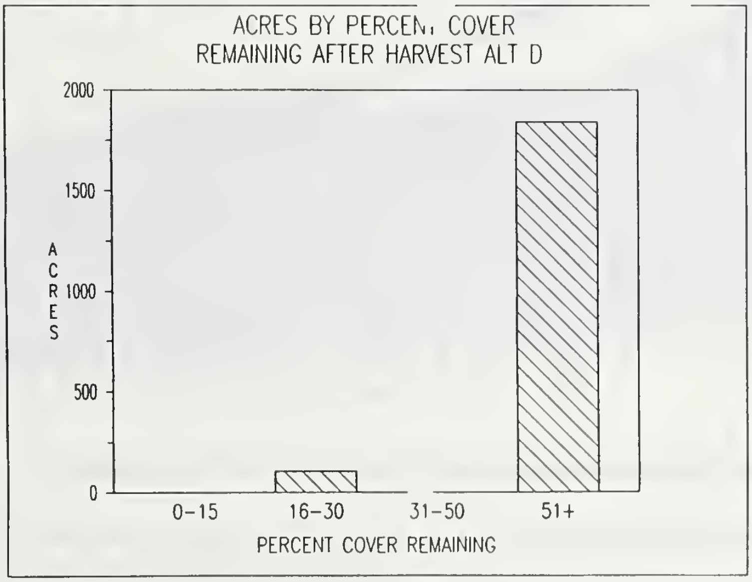


FIGURE 4-58

CONSISTENCY WITH THE FOREST PLAN: This action is consistent with the Forest Plan objectives for visual quality. It goes one step farther by meeting higher visual quality objectives than were adopted through the Forest Plan.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS

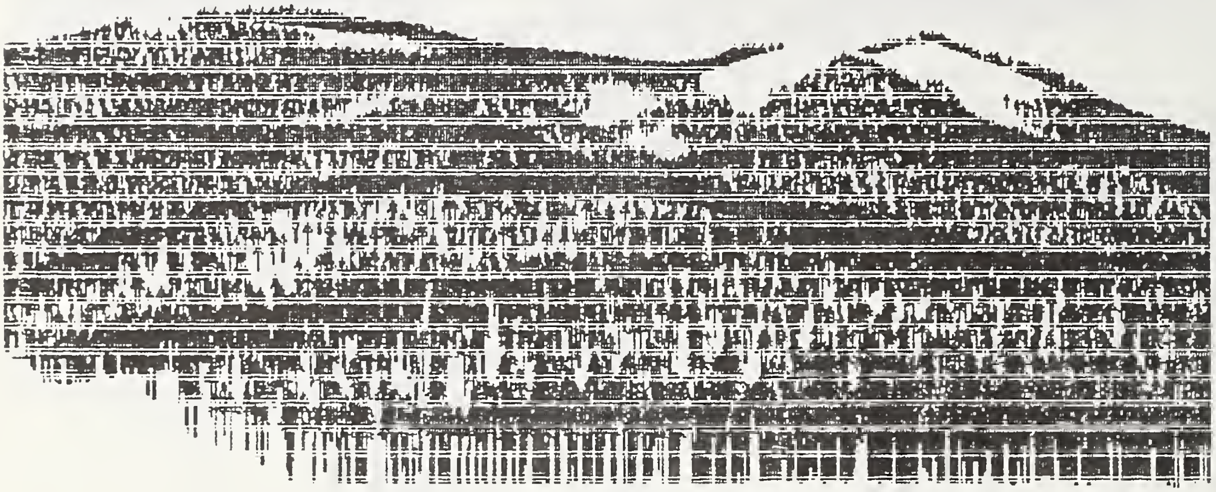


FIGURE 4-59 Foreground Basal Area thinning (unit 110) as seen from viewpoint 3.

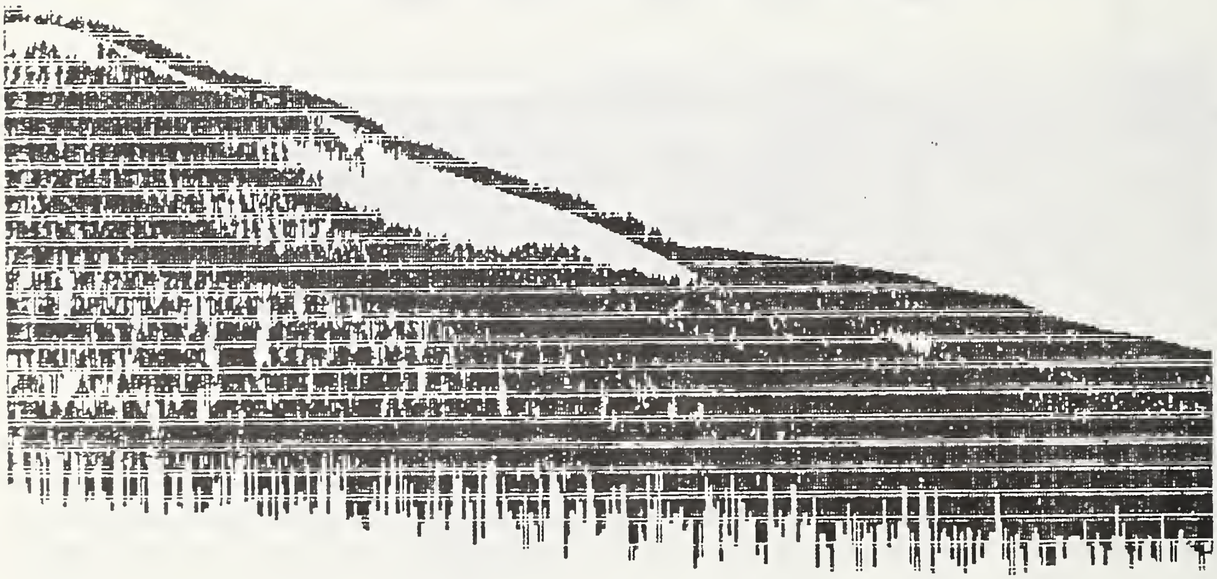


FIGURE 4-60 Harvest activities under Alternative D are not evident from viewpoint 4

FIGURE 4-61 Foreground shelterwood units (units 34 and 35) as seen from viewpoint 7.

ALTERNATIVE E

This alternative would add 105 acres of timber harvesting to the landscape that leaves 15 percent or less cover on the harvested area. It also adds 60 acres of harvesting that leaves 16 to 30 percent cover and 825 acres that leaves 51 percent or more cover on the harvested area. Under this alternative, no timber harvesting would take place within areas with a VCC of Untouched. There would be a reduction in the unnoticed VCC from 950 acres to 623 acres. There would be a corresponding increase in the VCC of Disturbed from 1,665 acres to 1,992 acres.

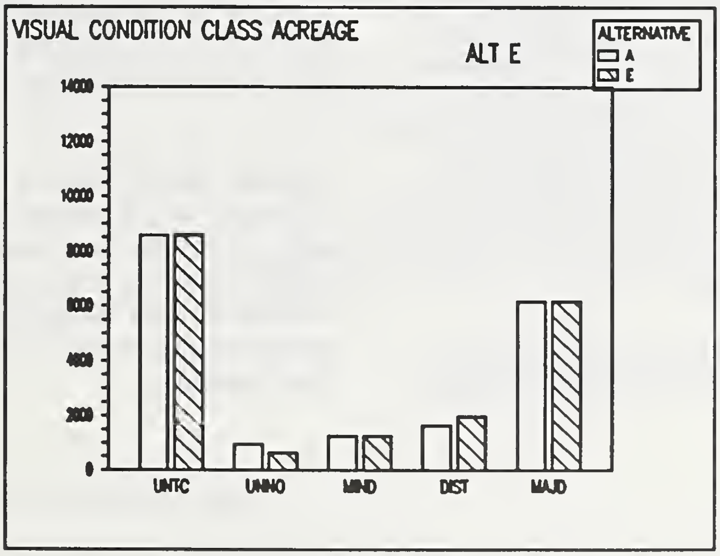


FIGURE 4-62

CONSISTENCY WITH THE FOREST PLAN: This action is consistent with Forest Plan objectives for visual quality; it meets the adopted visual quality objectives.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS: No timber harvesting would be visible from viewpoints 3, 4, or 7. See drawings of Alternative A for effects. Timber harvesting visible from viewpoint 14 would be the same as displayed for Alternative B2.

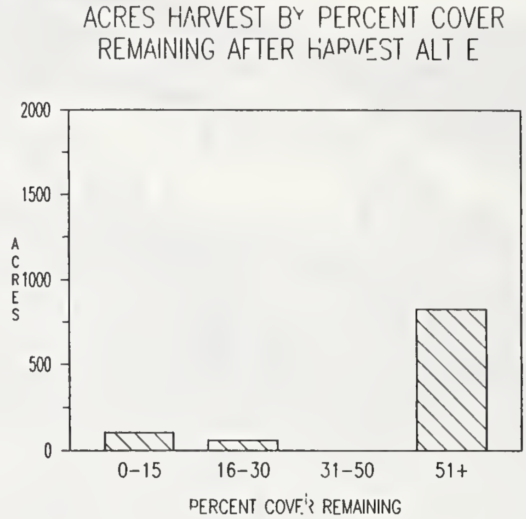


FIGURE 4-63

ALTERNATIVE EH

This alternative adds 339 acres of timber harvesting to the landscape that leaves 15 percent or less cover on harvested areas. It also adds 303 acres of harvesting that leaves from 16 percent to 30 percent percent cover; 159 acres that leave from 31 percent to 50 percent cover; and 1,868 acres of harvesting that leave 51 percent or more cover after harvesting. The result of this harvesting and roading would be a reduction in the Untouched VCC from 8,571 acres to 0 acres. The Unnoticed VCC would increase from 950 acres to 4,683 acres. 4,060 acres of this increase is from an area that would be untouched by timber harvesting. Since this would result in less than 5,000 acres of untouched VCC, it was included in the VCC of unnoticed. Disturbed VCC would increase from 1,665 acres to 6,363 acres.

This alternative contains the helicopter option in its entirety from Alternative J2H. The roaded portion of the alternative is from alternaive E and the roadless stands entered are from alternative J1. Eleven out of 14 of the Helicopter harvest units would be the less noticeable thinning and sanitation savlage units. Two shelterwood units and one overstory removal unit would be included on the steep river face. This increase in disturbance would cause this portion of the Decision Area to have a VCC of Disturbed in this alternative where the VCC of Minor Disturbance applied in Alternative J1.

Seedtree and shelterwood prescriptions for harvesting units in visually sensitive locations would be modified to provide more emphasis on visual quality. This would result in approximately 15 trees per acre being left on the unit until the first commercial thinning, or 60 years, to provide visual diversity.

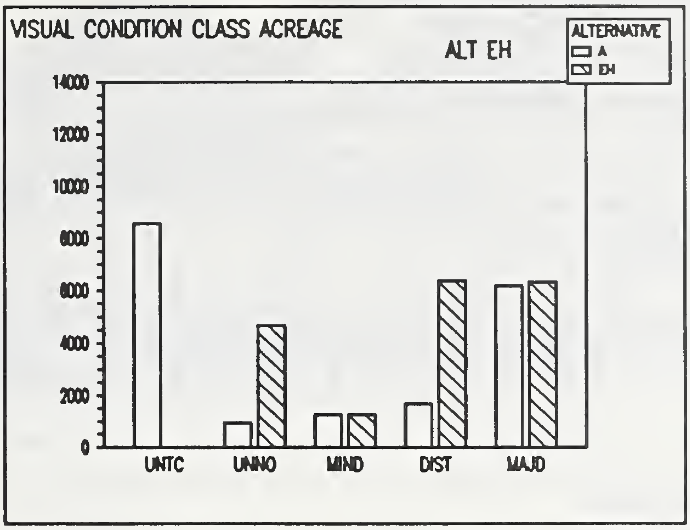
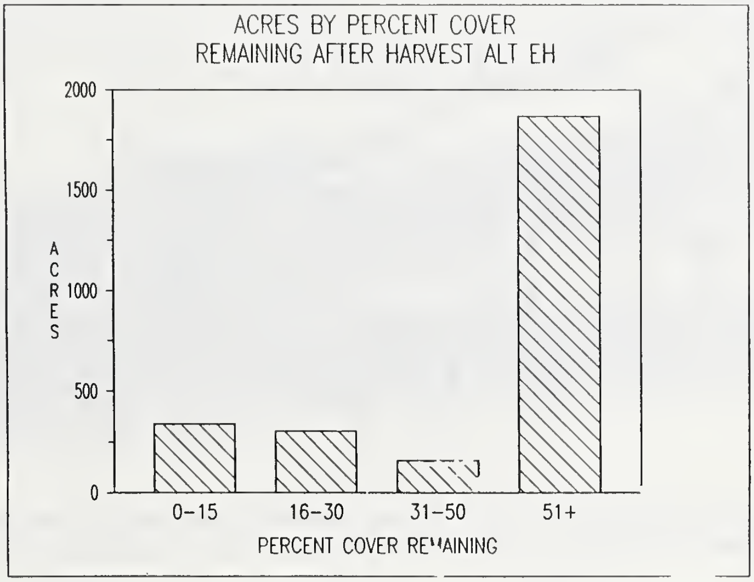


FIGURE 4-64

FIGURE 4-65



CONSISTENCY WITH THE FOREST PLAN

This action would meet Forest Plan adopted VQO's, therefore it is consistent with the Forest Plan.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS: The view from viewpoint 7 and 14 would be the same as displayed for Alternatives J2H and B2, respectively.

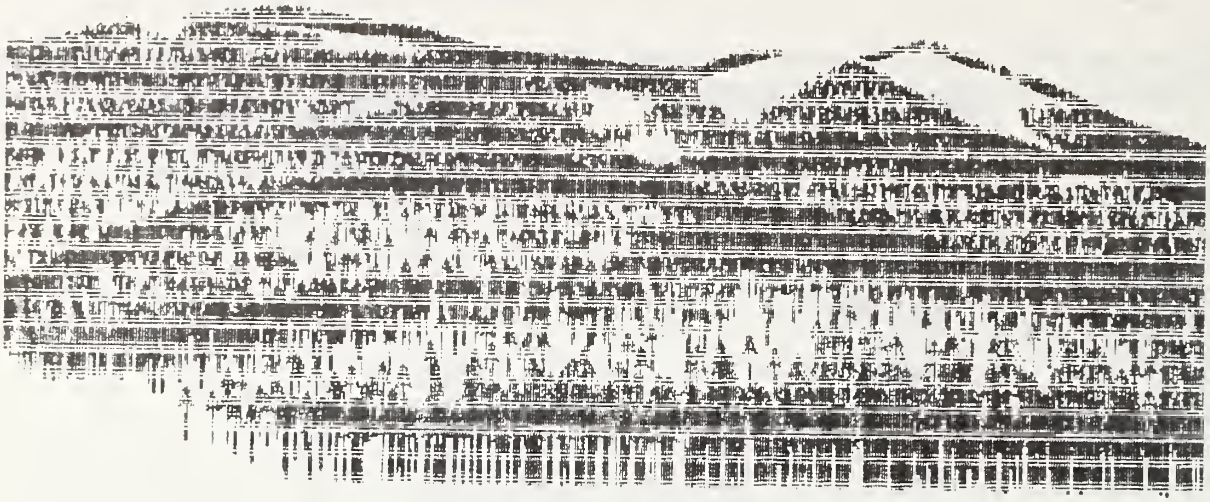


FIGURE 4-66 Foreground shelterwood units (unit 11 and 12) and Basal Area Thinning units (units 143, and 144) as seen from viewpoint 3.

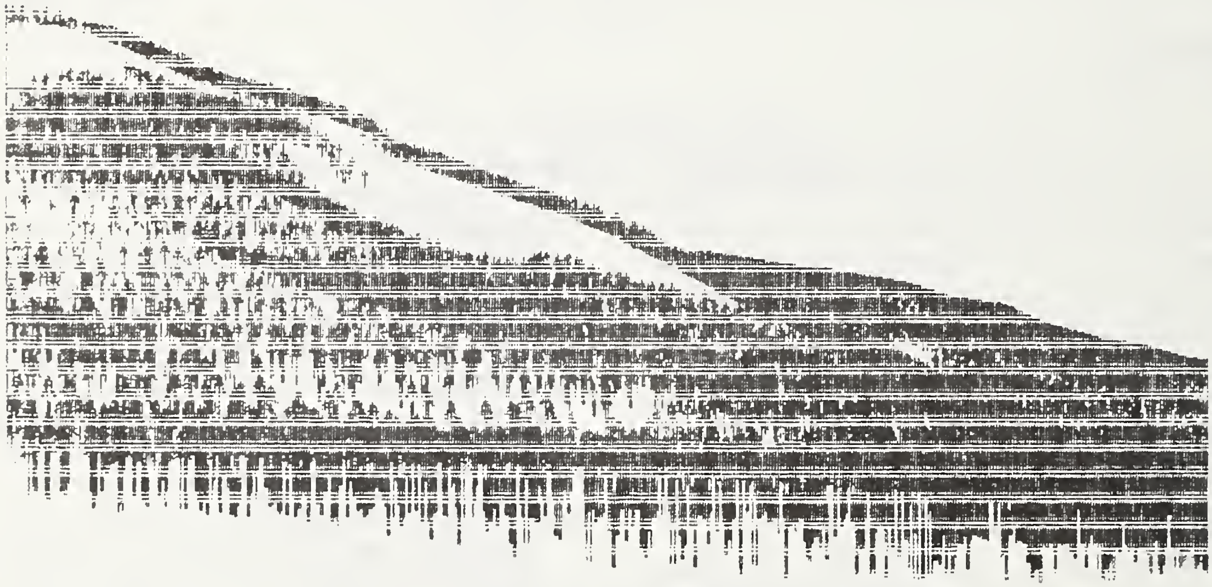


FIGURE 4-67 Foreground shelterwood unit (unit 13) and overstory removal unit with reserve trees (unit 140) as seen from viewpoint 4. A hint of a shelterwood unit (unit 14) is slightly noticeable next to unit 13.

ALTERNATIVE H

This alternative adds 522 acres of timber harvesting to the landscape that leaves 15 percent or less canopy cover on harvested areas. It also adds 133 acres of harvesting that leaves 16 percent to 30 percent cover and 1,040 acres that leaves 51 percent or more cover on harvested areas. The result of this harvesting would be a reduction in the Untouched VCC from 8,571 acres to 0 acres. There would be an increase in the Unnoticed VCC from 950 to 5,016 acres, approximately 4,400 acres of this could still be in the Untouched VCC but since it would be less that 5,000 acres it was classed as Unnoticed. Disturbed VCC would increase from 1,665 acres to 6,120.

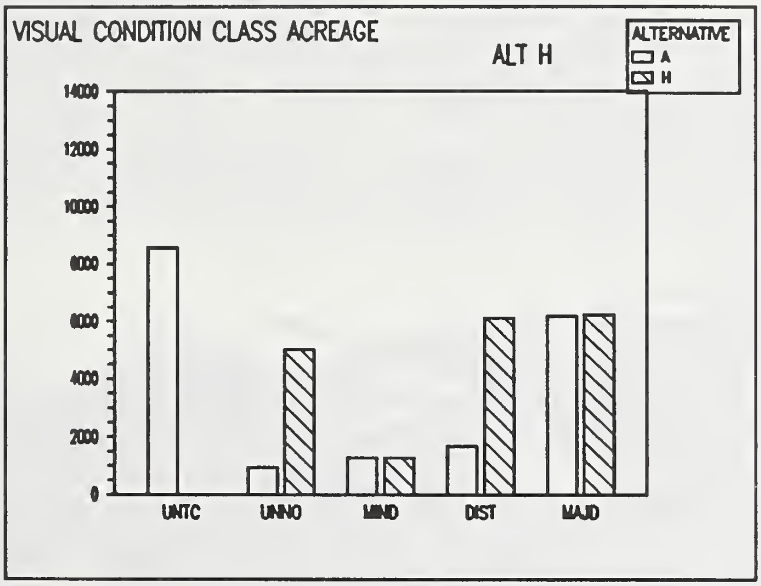


FIGURE 4-68

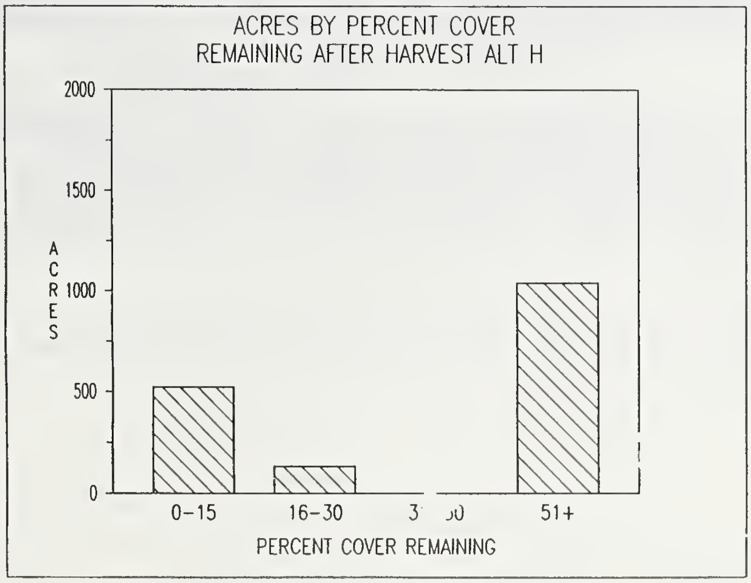


FIGURE 4-69

CONSISTENCY WITH THE FOREST PLAN:

Harvest units included in this alternative that were also included in Alternative B2 but did not meet the Adopted VQO's were modified as follows to meet VQO's:

- Harvest prescriptions were modified to seedtree or shelterwood where possible.

- Unit design was changed to reduce the seen area of units. This resulted in a reduction of even-aged regeneration harvest unit size or moving the unit to more gentle ground. The average size for even-aged regeneration harvest units for Alternative B2 was 29 acres, for this alternative it is 23 acres.

This action is consistent with the Forest Plan, it meets the Adopted VQO's.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS

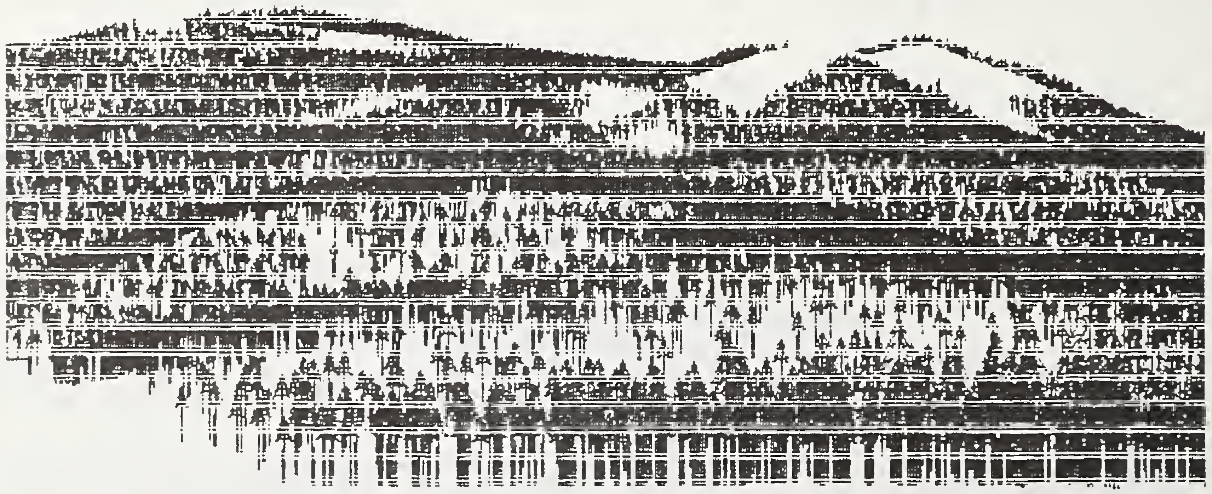


FIGURE 4-70 Foreground shelterwood units (unit 11 and 12) as seen from viewpoint 3.

FIGURE 4-71 Shows the addition of one seedtree unit (unit 13) to the foreground and one seedtree unit (unit 30), portions of which are visible in the background, to this view from viewpoint 4.

FIGURE 4-72 Foreground seedtree harvest units (units 34 and 45) as seen from viewpoint 7.

ALTERNATIVE I

This alternative adds 365 acres of timber harvesting to the landscape that leaves 15 percent or less cover on harvested areas. It also adds 740 acres of harvesting that leaves 51 percent or more canopy cover. The result of this harvesting and roading would be a reduction in the Untouched VCC from 8,571 acres to 0 acres. The Unnoticed VCC would increase from 950 acres to 6,248 acres.

There would be no blocks of the Untouched VCC in excess of 5,000 acres. Therefore, all Untouched areas were included in the Unnoticed VCC class. Minor Disturbance VCC would increase from 1,265 acres to 3,608 acres and the VCC of Disturbed would increase from 1,665 acres to 2,545 acres.

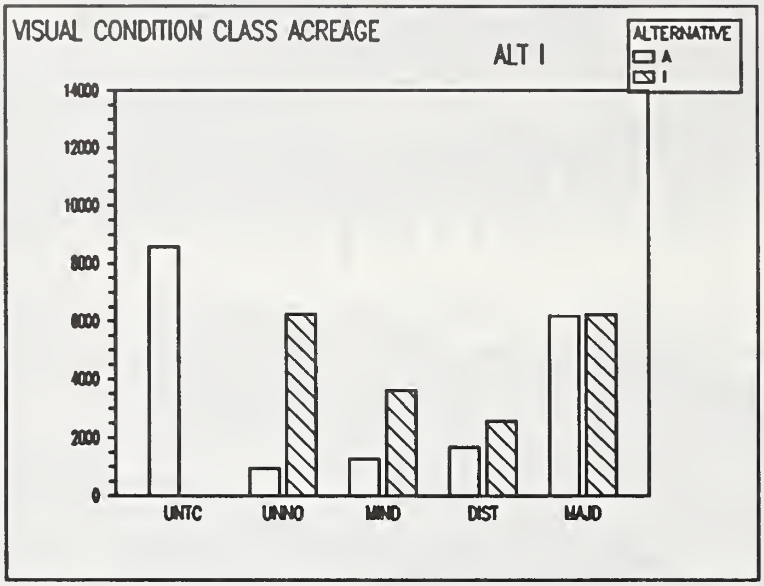


FIGURE 4-73

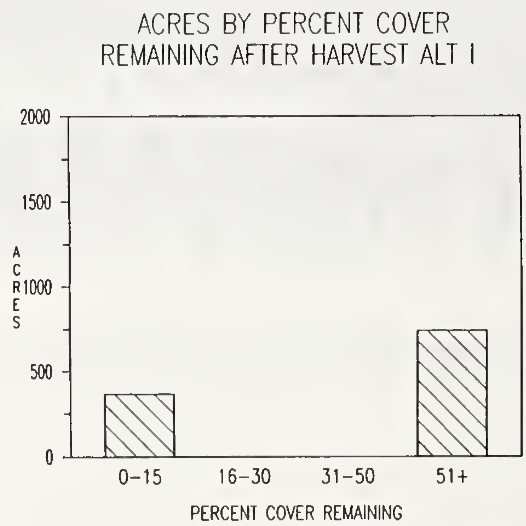


FIGURE 4-74

CONSISTENCY WITH THE FOREST PLAN

This action would meet Forest Plan adopted VQO's, therefore it is consistent with the Forest Plan.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS

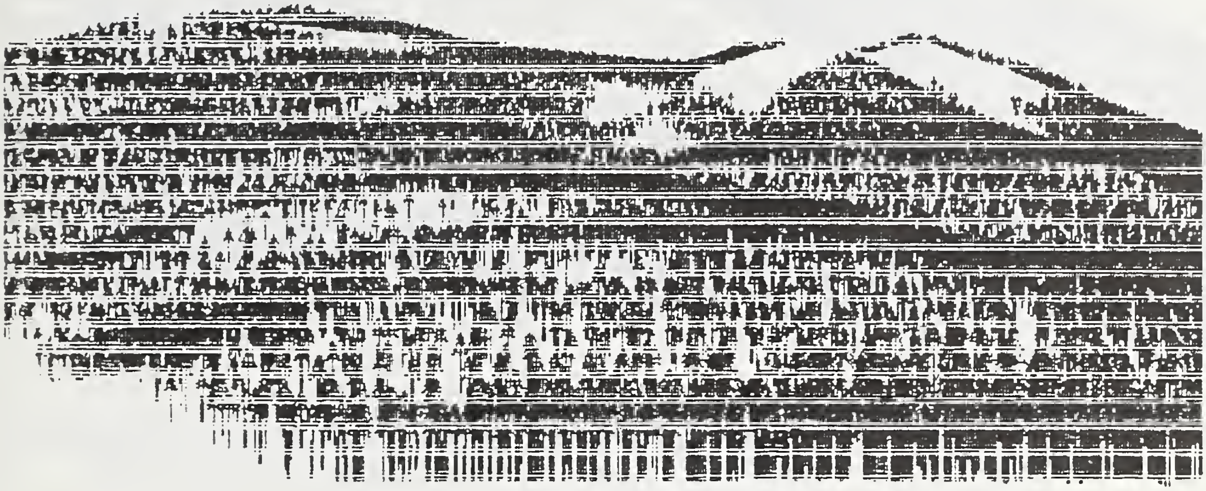


FIGURE 4-75 Foreground seedtree units (unit 11, 12, 12A, and 12B) as seen from viewpoint 3. Units 12, 12A, and 12B are 5 acres each and are hard to see as compared to unit 11.

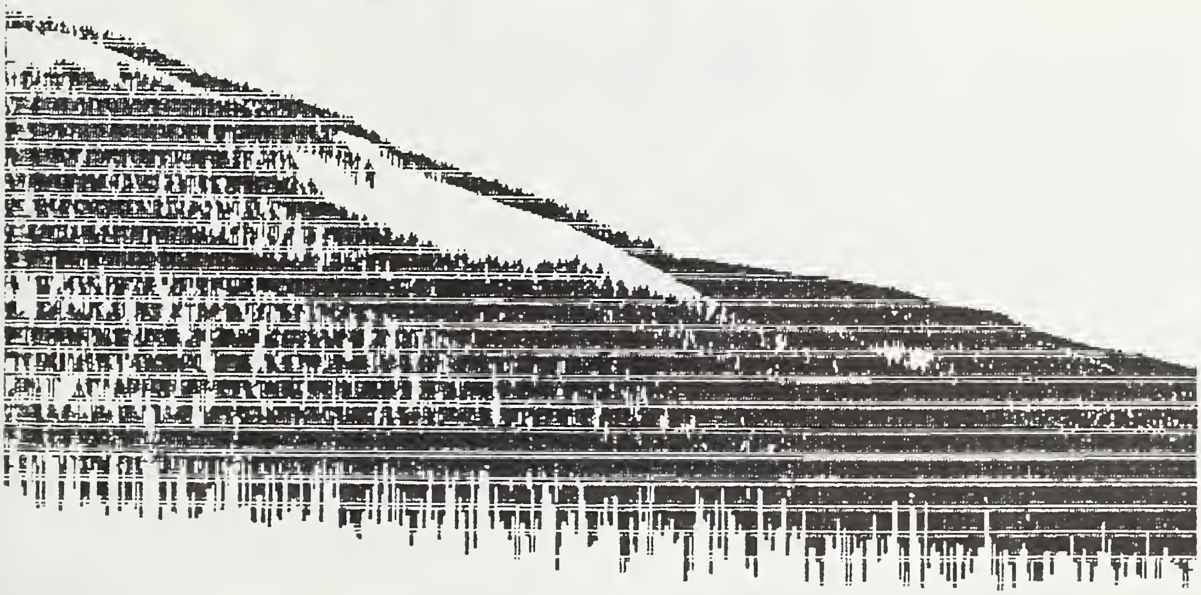


FIGURE 4-76 Background seedtree unit (unit 30) as seen from viewpoint 4.

FIGURE 4-77 Foreground seedtree units (units 26, 27, 28, and 29) as seen from viewpoint 7. These units are 5 acres in size each.

ALTERNATIVE J1

This alternative adds 390 acres of timber harvesting to the landscape that leaves 15 percent or less cover on harvested areas. It also adds 160 acres of harvesting that leaves from 16 percent to 30 percent cover and 997 acres of harvesting that leaves 51 percent or more cover after harvesting.

The result of this harvesting and roading would be a reduction in the Untouched VCC from 8,571 acres to 6,934 acres. The Unnoticed VCC would decrease from 950 acres to 623 acres. Minor Disturbance VCC would increase from 1,265 acres to 2,867 acres and Disturbed VCC increased from 1,665 acres to 1,887 acres.

Seedtree and shelterwood prescriptions for harvesting units in visually sensitive locations would be modified to provide more emphasis on visual quality. This would result in approximately 15 trees per acre being left on the unit until the first commercial thinning, or 60 years, to provide visual diversity.

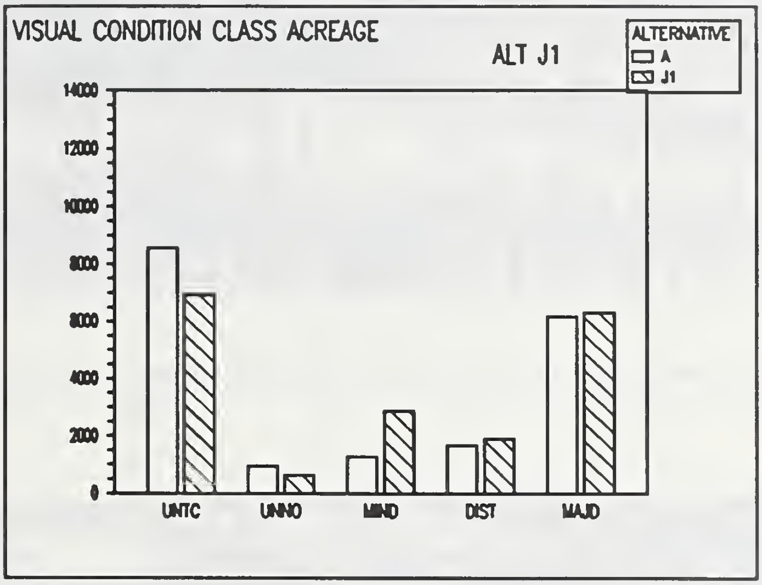


FIGURE 4-78

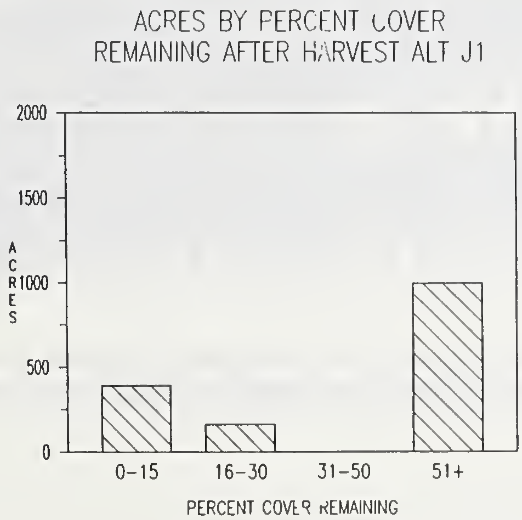


FIGURE 4-79

CONSISTENCY WITH THE FOREST PLAN

This action would meet Forest Plan adopted VQO's, therefore it is consistent with the Forest Plan.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS

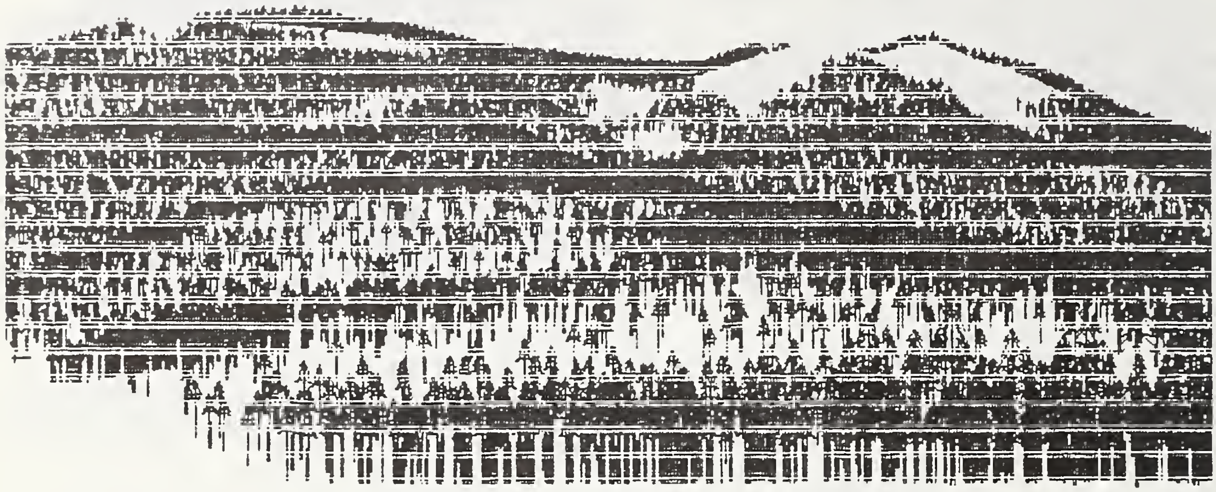


FIGURE 4-80 Foreground shelterwood units (unit 11 and 12) as seen from viewpoint 3.

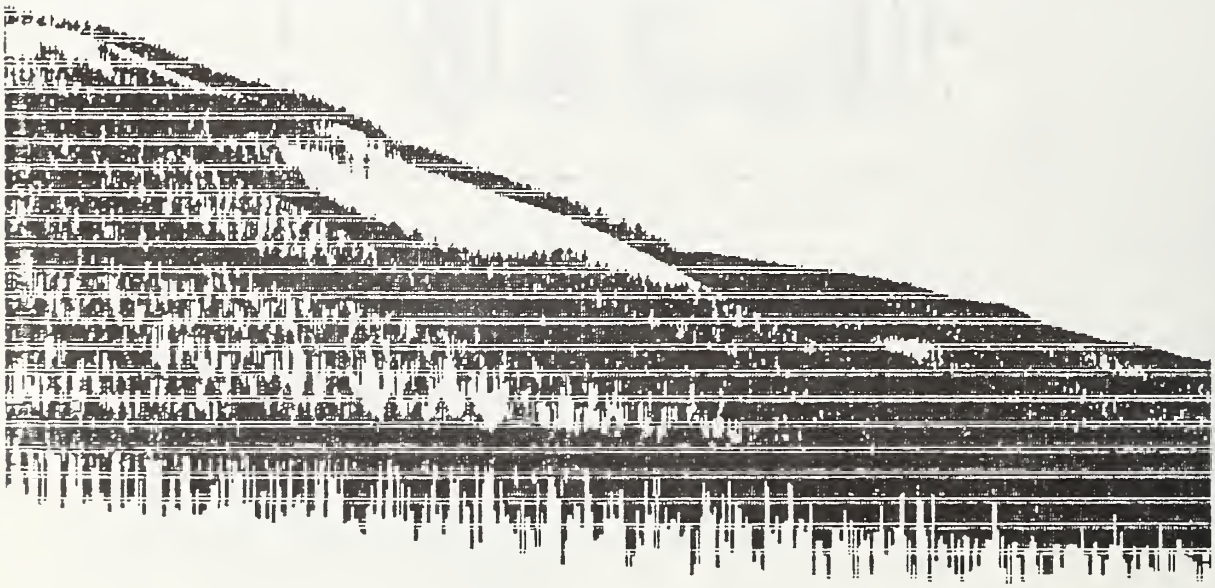


FIGURE 4-81 Foreground seedtree unit (unit 13) and background seedtree unit (unit 30) as seen from viewpoint 4. A hint of a shelterwood unit (unit 14) is slightly noticeable next to unit 13.

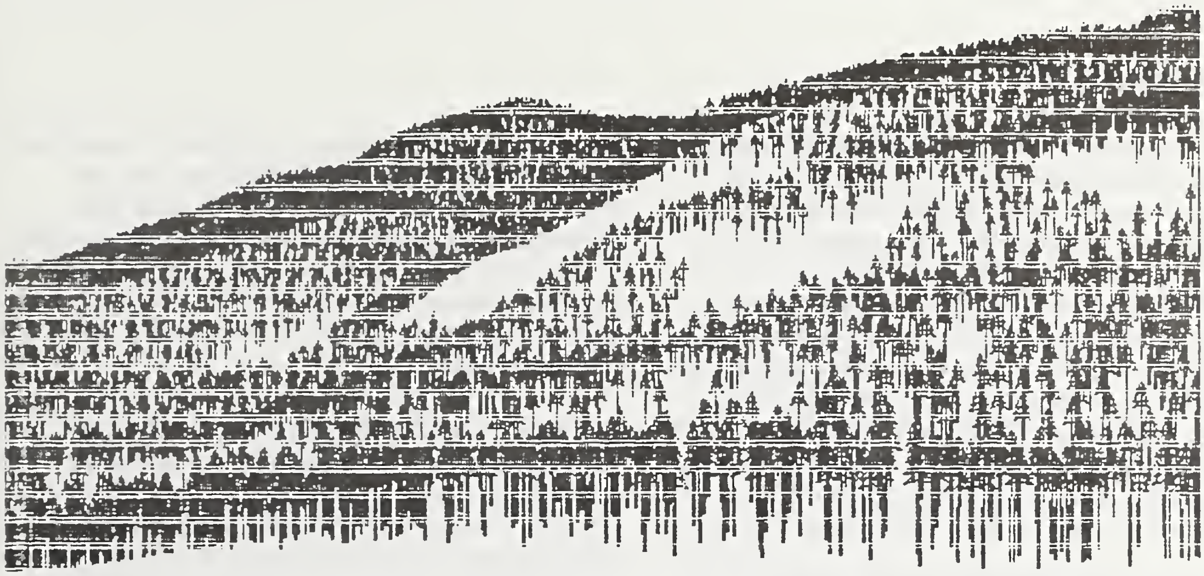


FIGURE 4-82 Foreground shelterwood units (units 34 and 35) as seen from viewpoint 7.

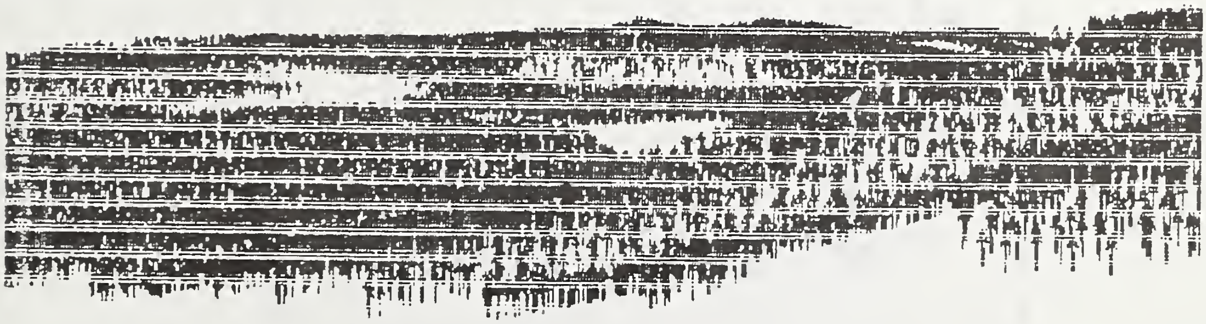


FIGURE 4-83 Middleground thinning units (units 130, 130A, 132, 132A, and 133), as seen from viewpoint 14, and their effect on the contrast between the existing units and adjacent stands of timber. Notice how proposed harvesting would reduce the straight line edge effect of previous harvesting. This view would be the same for Alternatives J1, J2, and J2H. This partial cut depiction will not be repeated under the other two alternatives.

ALTERNATIVE J2

This alternative adds 515 acres of timber harvesting to the landscape that leaves 15 percent or less cover on harvested areas. It also adds 200 acres of harvesting that leave from 16 percent to 30 percent percent cover and 1,052 acres of harvesting that leave 51 percent or more cover after harvesting. The result of this harvesting and roading would be a reduction in the Untouched VCC from 8,571 acres to 5,579 acres. The Unnoticed VCC would decrease from 950 acres to 623 acres. Minor Disturbance VCC would increase from 1,265 acres to 1,592 acres and Disturbed VCC would increase from 1,665 acres to 4,517 acres.

The major difference between this alternative and Alternative J1 was the additional of four units along the Moyie River face. In addition, the average size of the seedtree and shelterwood harvest units in this portion of the Decision Area was increased by an average of five acres. This increase in disturbance would cause this portion of the Decision Area to have a VCC of Disturbed in this alternative where the VCC of Minor Disturbance applied in Alternative J1.

Seedtree and shelterwood prescriptions for harvesting units in visually sensitive locations would be modified to provide more emphasis on visual quality. This would result in approximately 15 trees per acre being left on the unit until the first commercial thinning, or 60 years, to provide visual diversity.

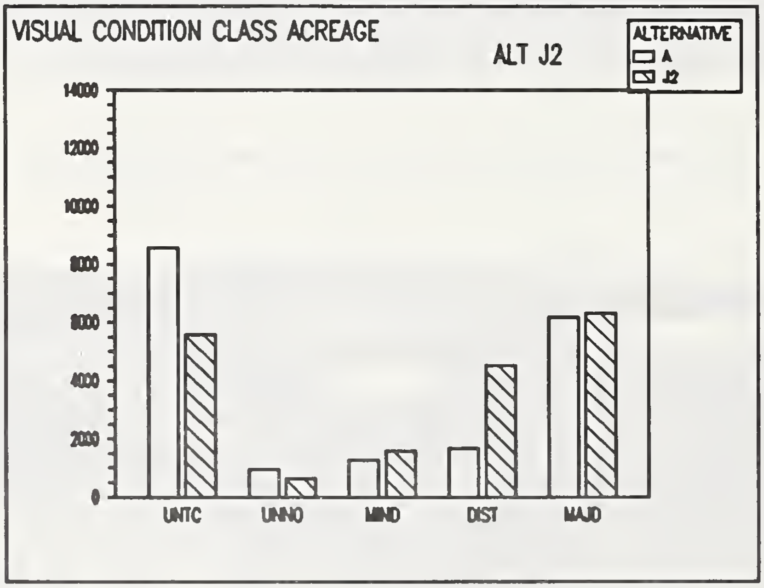


FIGURE 4-84

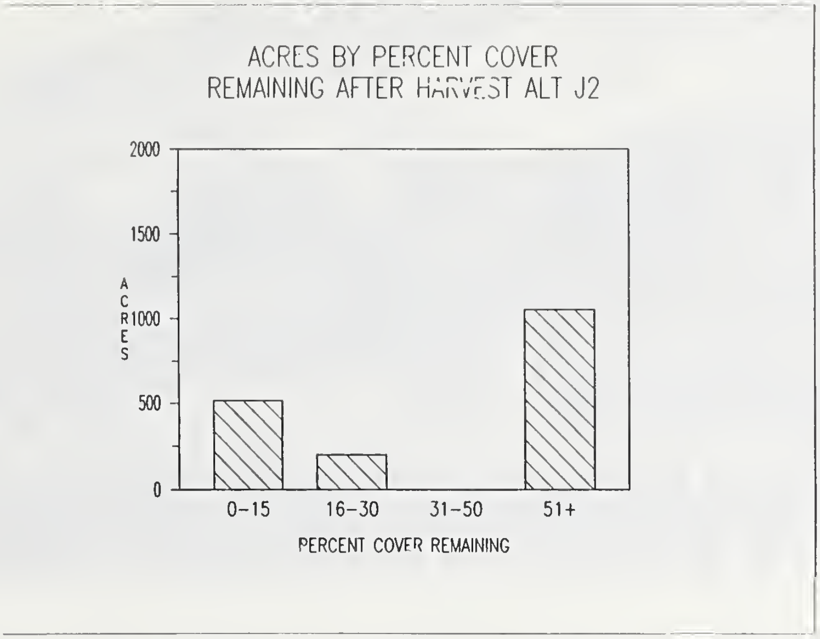

ACRES BY PERCENT COVER
REMAINING AFTER HARVEST ALT J2
2000
1500
ACRES
1000
500
0
0-15
16-30
31-50
51+
PERCENT COVER REMAINING

FIGURE 4-85

CONSISTENCY WITH THE FOREST PLAN

This action would meet Forest Plan adopted VQO's, therefore it is consistent with the Forest Plan.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS

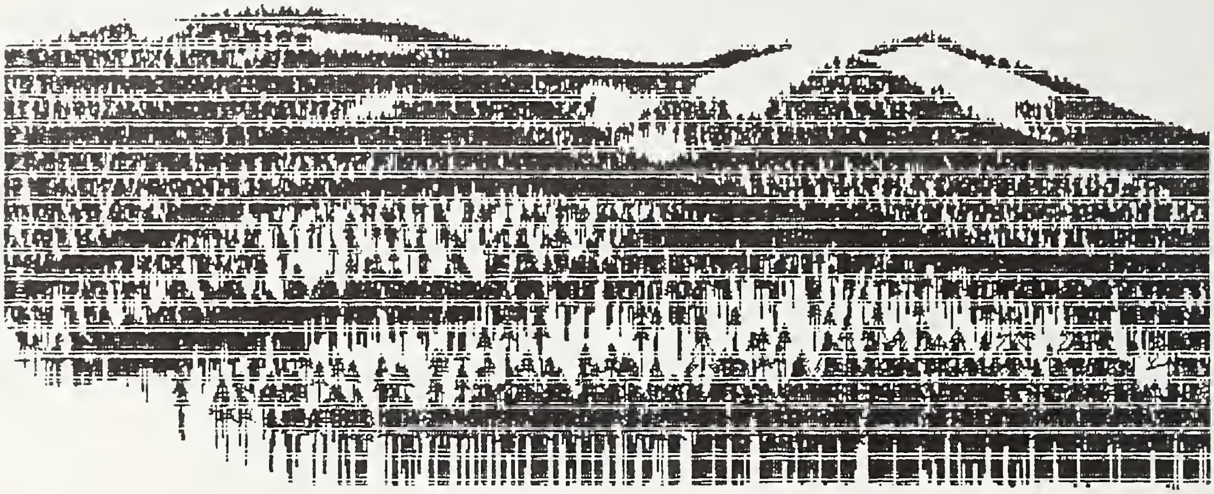


FIGURE 4-86 Foreground shelterwood units (unit 11 and 12) and Basal Area Thinning unit (unit 11A) as seen from viewpoint 3.

FIGURE 4-87 Foreground seedtree unit (unit 13) and background seedtree unit (unit 30) as seen from viewpoint 4. A hint of a shelterwood unit (unit 14) is slightly noticeable next to unit 13.

FIGURE 4-88 Foreground shelterwood units (units 34 and 35) as seen from viewpoint 7.

ALTERNATIVE J2H

This alternative adds 594 acres of timber harvesting to the landscape that leaves 15 percent or less cover on harvested areas. It also adds 240 acres of harvesting that leaves from 16 percent to 30 percent percent cover; 159 acres that leave from 31 percent to 50 percent cover; and 1,980 acres of harvesting that leave 51 percent or more cover after harvesting. The result of this harvesting and roading would be a reduction in the Untouched VCC from 8,571 acres to 0 acres. The Unnoticed VCC would increase from 950 acres to 3,546 acres. Disturbed VCC would increase from 1,665 acres to 7,500 acres.

The difference between this alternative and Alternative J2 was the addition of 1,206 acres of helicopter logging along the Moyie River face.

Eleven out of 14 of these harvest units would be the less noticeable thinning and sanitation savlage units. Two shelterwood units and one overstory removal unit would be included on the steep river face. This increase in disturbance would cause this portion of the Decision Area to have a VCC of Disturbed in this alternative where the VCC of Minor Disturbance applied in Alternative J1.

Seedtree and shelterwood prescriptions for harvesting units in visually sensitive locations would be modified to provide more emphasis on visual quality. This would result in approximately 15 trees per acre being left on the unit until the first commercial thinning, or 60 years, to provide visual diversity.

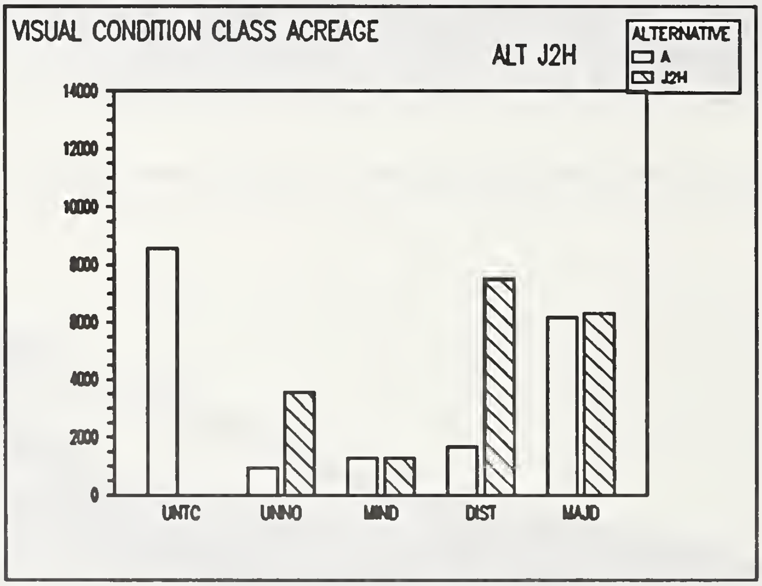


FIGURE 4-89

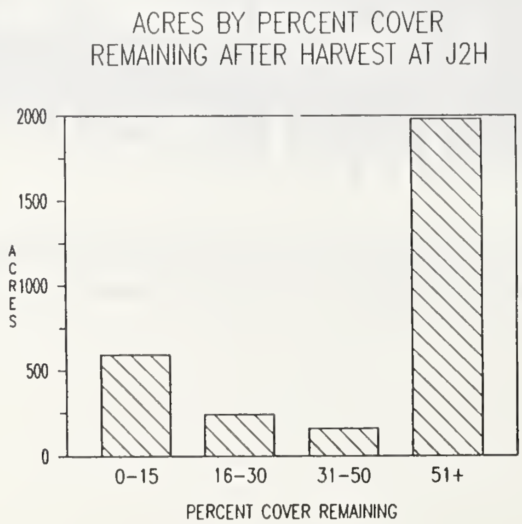


FIGURE 4-90

CONSISTENCY WITH THE FOREST PLAN

This action would meet Forest Plan adopted VQO's, therefore it is consistent with the Forest Plan.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS

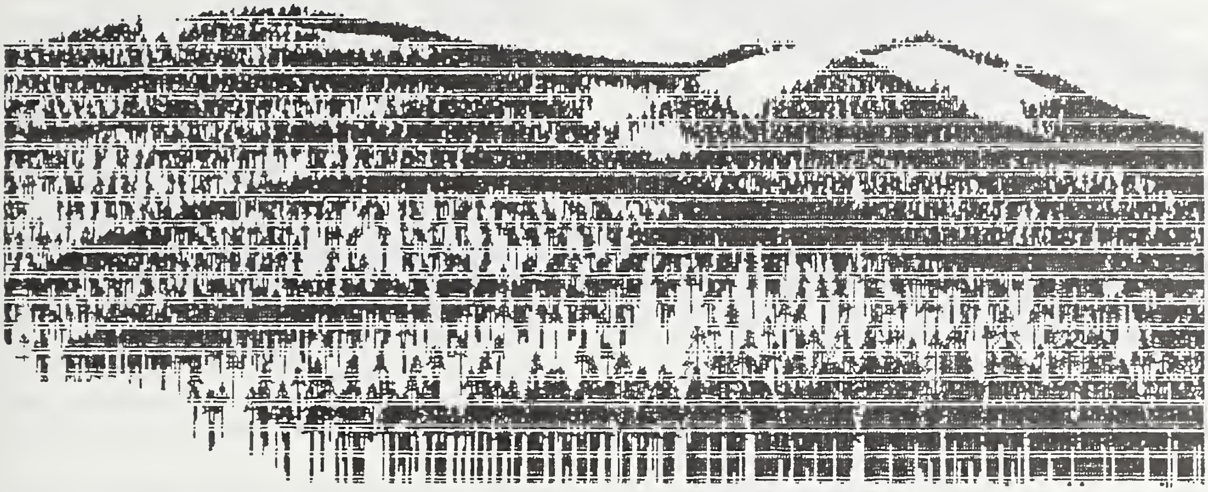


FIGURE 4-91 Foreground shelterwood units (unit 11 and 12) and Basal Area Thinning units (units 11A, 143, and 144) as seen from viewpoint 3.

FIGURE 4-92 Foreground seedtree unit (unit 13) and overstory removal unit with reserve trees (unit 140), background seedtree unit (unit 30) as seen from viewpoint 4. A hint of a shelterwood unit (unit 14) is slightly noticeable next to unit 13.

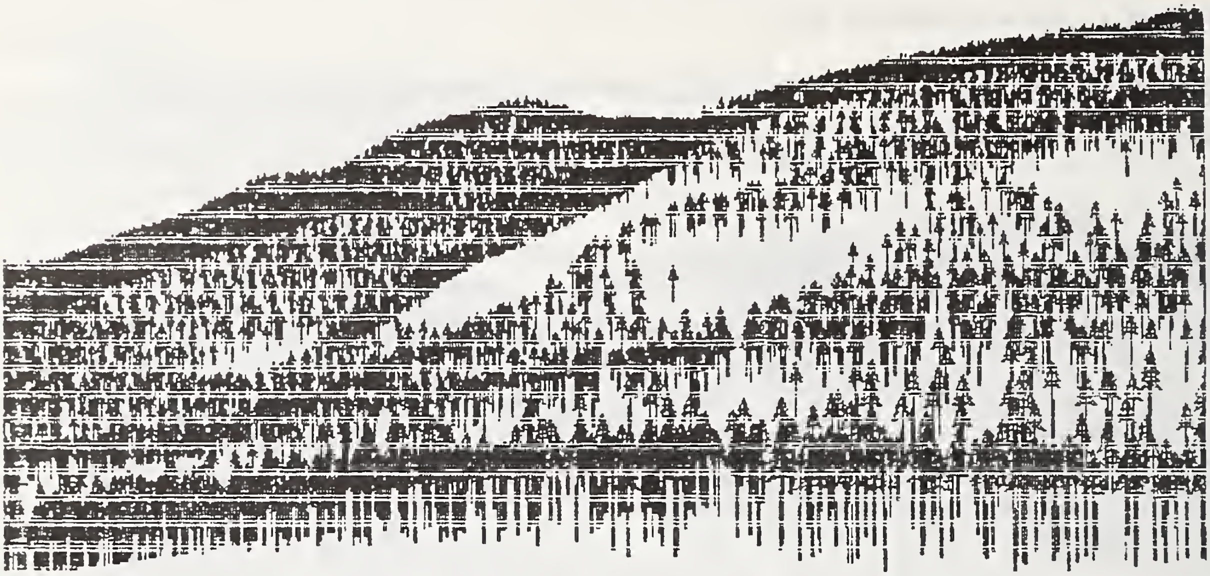


FIGURE 4-93 Foreground shelterwood units (units 34 and 35) as seen from Viewpoint 7.

ALTERNATIVE K

This alternative adds 219 acres of timber harvesting to the landscape that leaves 15 percent or less cover on harvested areas. It also adds 243 acres of harvesting that leaves from 16 percent to 30 percent percent cover; 159 acres that leave from 31 percent to 50 percent cover; and 2477 acres of harvesting that leave 51 percent or more cover after harvesting. This harvesting and roading would result in the elimination of the Untouched VCC. The Unnoticed VCC would increase from 950 acres to 4373 acres. 3750 acres of this increase are from areas that would be untouched by timber harvesting. Since this would result in less than 5,000 acres of untouched VCC, it was included in the VCC of unnoticed. Minor Disturbance VCC would increase from 1265 acres to 2415 acres and Disturbed VCC would increase from 1,665 acres to 5523 acres.

This alternative contains a portion of the helicopter option from alternative J2H. Nine out of 12 of the Helicopter harvest units would be the less noticeable thinning and sanitation savlage units. Two shelterwood units and one overstory removal unit would be included on the steep river face. This increase in disturbance would cause this portion of the Decision Area to have a VCC of Disturbed in this alternative.

Even-aged regeneration harvesting units visable from the viewpoints established in Chapter three would be shelterwood harvested. These would be less noticable than the clearcut and seedtree units proposed with other alternatives. Salvaging of white pine and uneven-aged management, both group selection and single tree selection, would not be obvious from these viewpoints. Seedtree and shelterwood prescriptions for harvesting units in visually sensitive locations would be modified to provide more emphasis on visual quality. This would result in approximately 15 trees per acre being left on the unit until the first commercial thinning, or 60 years, to provide visual diversity.

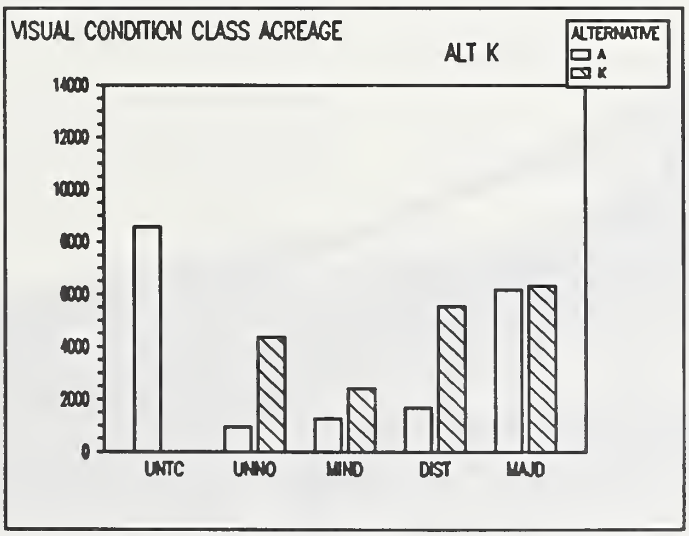


FIGURE 4-94

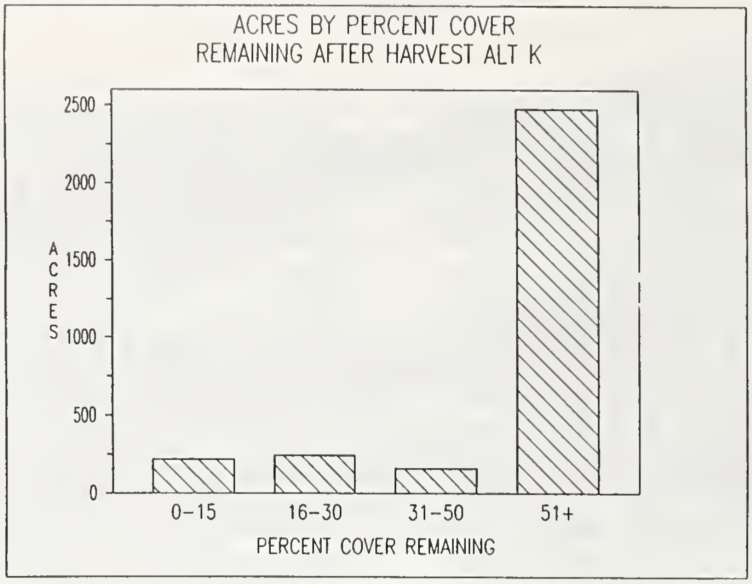


FIGURE 4-95

CONSISTENCY WITH THE FOREST PLAN

This action would meet Forest Plan adopted VQO's, therefore it is consistent with the Forest Plan.

DIRECT EFFECTS FROM SPECIFIC VIEWPOINTS: The view from viewpoint 3 and 7 would be the same as displayed for Alternatives J2H.

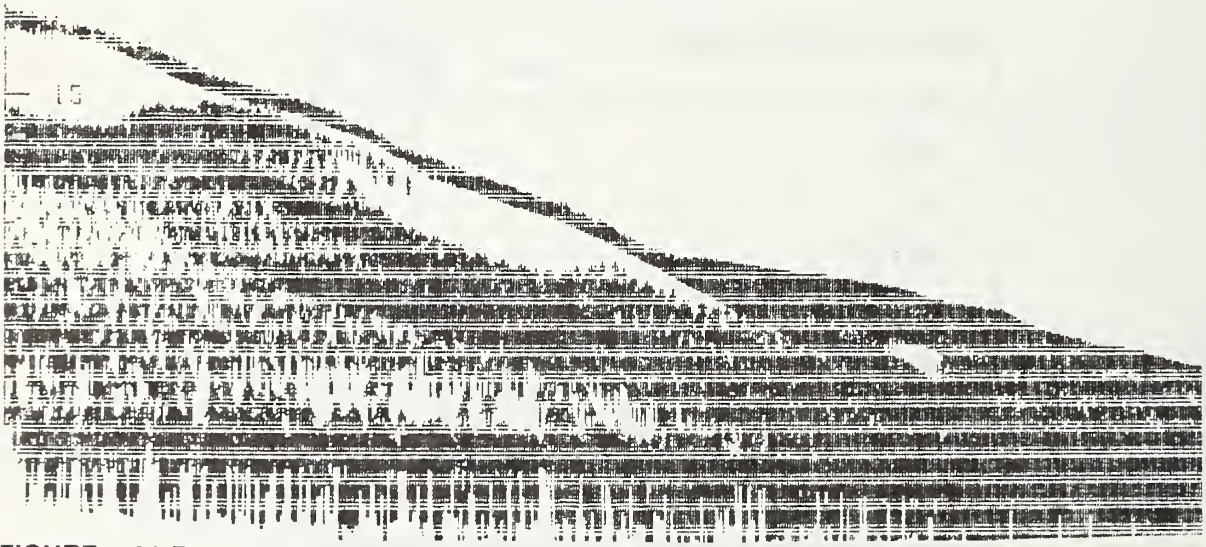


FIGURE 4-96 Foreground shelterwood unit (unit 13) and helicopter overstory removal unit (units 140) as seen from viewpoint 4.

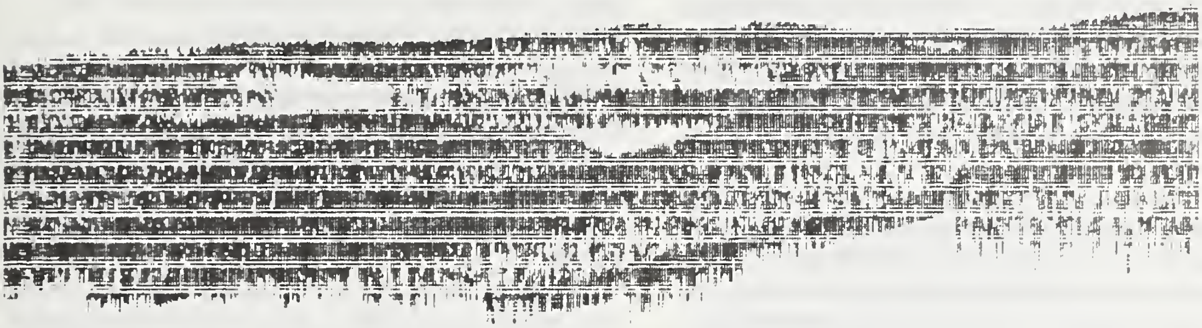


FIGURE 4-97 Middleground thinning units (units 130, 130A, 132, 132A, 132B, 133, and 133A), as viewed from viewpoint 14, and their effect of the contrast between the existing units and adjacent stands of timber. Notice how proposed harvesting would reduce the straight line edge effect of previous harvesting. The appearance of the existing harvesting units would be changed into a more linear connected line, copying the line of the ridge above the units.

INTRODUCTION

The various alternatives' effects on wildlife are discussed in this chapter. The analysis for Management Indicator Species related to mature and old-growth timber stands is first, followed by Big Game Management Indicator Species. Information on Threatened and Endangered wildlife is in Appendix D .

Each species report is broken into Analysis Methods, Effects Common to All Alternatives, Possible Effects of Other Jurisdictions, and Consistency With the Forest Plan. Detailed descriptions of each alternative follow the narration of the common effects.

The wildlife species are presented in this order:

MATURE AND OLD-GROWTH RELATED SPECIES

BOREAL OWL
(*Ageolus funerius*)

Idaho Fish & Game Status: species of Special Concern (Category A)
USFS Region One Status: Sensitive species

The area analyzed for boreal owl habitat encompasses the entire habitat island of spruce and fir trees which occur around the Queen/Bussard/Tungsten Mountain complex. This area is approximately 6,600 acres. Out of this, 5,200 acres are classified as potential boreal owl habitat. Approximately 1,200 acres of treeless ridgelines and very open park-like stands of spruce fir are not suitable boreal owl habitat.

Alternatives were analyzed using two components of owl habitat - nesting and feeding habitat. Tentative recommendations to maintain a local population within the Decision Area include holding 30 percent or more of the area above 5,000 feet in mature to old growth stands for nesting habitat, and 50 percent or more of the area in immature sawtimber and older size classes for foraging habitat (Hayward, 1989c). These recommendations apply to populations associated with a habitat island, such as the Decision Area.

Threshold levels are estimations for an unmanaged situation and should be applied with caution in a managed situation. The 30 percent level for nesting habitat and 50 percent level for foraging habitat would be used as thresholds for analysis of habitat quality.

EFFECTS COMMON TO ALL ALTERNATIVES

Removal of forest canopy through regeneration harvesting has direct effects on boreal owl habitat. Clearcut, seed tree and shelterwood cuts are considered to be unsuitable for owl use. Basal area thinning in foraging habitat is considered acceptable. Salvage harvesting in nesting and foraging habitat would have a minimal effect if snag management guidelines, with an emphasis on maintaining large diameter snags, are followed.

The current condition of the area is such that all alternatives begin with nesting habitat that is below the 30 percent threshold level. All alternatives would maintain sufficient feeding habitat to support at least one to two pairs of boreal owls within the analysis area.

Potential old growth recruitment stands have been identified by the ID Team. This was done in conjunction with development of the preferred alternatives during preparation of the Draft EIS, but would fit with any of the alternatives. Alternatives I and K would not harvest timber in these stands. Other alternatives would harvest minor amounts as identified in the vegetation section (Chapter 2, Table 2-9).

The recruitment stands were identified to compliment the existing old growth and provide the option to manage for 10 percent old growth per old growth management unit in the future. These stands currently provide feeding habitat. When they mature they would provide potential nesting sites. These designated recruitment stands would result in a potential 8.2 percent increase in nesting

stands as they progress to mature and old growth conditions. For all alternatives, over 30 percent of the analysis area would provide nesting habitat in the future.

Boreal owls are secondary cavity nesters and require populations of primary excavators (pileated woodpeckers) to supply nest sites. Reductions in pileated woodpecker nesting habitat in the transition area between cedar-hemlock habitat type and spruce-fir habitat type may reduce the availability of cavities for boreal owl nest sites.

All alternatives would follow the IPNF Snag Management Guidelines requiring the retention of one wildlife tree and two replacement trees per acre in all cutting units accessed by road. The retention of snag and replacement trees would provide wildlife tree habitat at a minimum level for 40 percent of the population potential of cavity nesting wildlife within MA-1 of the Decision Area.

Small salvage sales are often planned to harvest windthrown trees located around the edges of regeneration units, or to harvest seed trees that have blown over. These sales would cause minimal reduction of habitat.

The area necessary to support a self-sustaining population is unknown; but is likely to exceed 1000 square kilometers or 386 square miles (Hayward, 1989b). It is probable that enough suitable habitat exists in the Purcell and Selkirk Mountains to maintain self-replacing populations. However, the cumulative effects on boreal owl habitat from regeneration harvesting across the landscape in addition to naturally occurring events such as fire, are unknown. This analysis addresses the effects of timber management on the local population only.

Possible Effects of Other Jurisdictions

Other jurisdictions have no effect on the boreal owl in the Decision Area.

Consistency With the Forest Plan

The habitat of species listed on the Region One Sensitive species List should be managed to prevent further declines in populations which may cause a species to become threatened or endangered (Forest Plan, p. II-28). This includes providing habitat that would support at least a minimum number of reproductive individuals, and distributing habitat so that individuals can interact with others in the planning area (36 CFR 219.29). Planning area is defined under 36 CFR 219.3 as that area of the National Forest covered by a regional guide or forest plan.

Reduction in habitat which does not cause a decline in population and thereby does not cause a species to become threatened or endangered, is consistent with Forest Plan standards. However, a decline in a population that would effect the long term viability of a species would not be consistent with the Forest Plan.

Distribution of suitable feeding and nesting habitat over the landscape is important. The size and distribution of habitat islands, including the dispersal requirements needed to support a viable population of boreal owls, is currently unknown. A further reduction in habitat quality on the West Moyie Decision Area may effect the local population. However, it is unknown what effect that may have on the total population.

ALTERNATIVE A

The No Action Alternative would retain nesting and feeding habitat values at existing levels, 25.1 percent and 56.7 percent respectively. Due to the long term nature of succession, little increase in nesting and feeding habitat would occur during the ten year period of analysis.

This alternative would not result in reduction of nesting and foraging habitat and there would be no significant effects to owl habitat.

ALTERNATIVE B2

This alternative would have the greatest effect on boreal owl habitat. Approximately 290 acres of regeneration harvest would reduce nesting and feeding habitat. This includes loss of 14 acres of old growth spruce-fir which has high potential as nesting habitat. Nesting habitat, already below the recommended threshold, would be reduced

2.0 percent, from 25.1 percent to 23.1 percent. Feeding habitat would be reduced 6.7 percent, from 56.7 percent to 50.0 percent, but would meet threshold level guidelines.

Alternative B2 would further reduce the potential for the area to support a self-replacing population. Old growth stands supply both nesting cavities and large quantities of prey necessary to support adults and rear young. Erecting nest boxes would mitigate for loss of natural nesting sites, but would not compensate for loss of prey supply.

Loss of nesting stands under this alternative would increase the probability of local extirpation (elimination of a species in a local area due to loss of habitat needed to sustain the population).

ALTERNATIVE D

This alternative would essentially maintain nesting habitat at existing levels; reduction would be less than 0.1 percent. There is such minimal effect because there is no regeneration harvest within nesting habitat. Unit 127 plus 14 acres of old growth spruce-fir would be salvage harvested. However this would have insignificant effect on nesting habitat. Foraging habitat would be reduced by 1.1 percent, from 56.7 percent to 55.6 percent; still within management recommendations.

This alternative would have a minimal impact on boreal owl habitat. The number of suitable nesting stands would not be reduced and foraging habitat meets requirements. Reduction in the ability of the Decision Area to maintain a local population is minimal when compared to existing conditions.

ALTERNATIVE E

This alternative would maintain nesting habitat at existing levels. There would be some impact due to 75 acres of seed tree harvest. Potential nesting habitat would be reduced by 0.2 percent, from 25.1 percent to 24.9 percent. Feeding habitat would be reduced by 1.1 percent from 56.7 percent to 55.6 percent, which is still within guidelines.

This alternative would have a minimal impact on boreal owl habitat. The amount of suitable nesting stands would be slightly reduced. Foraging habitat meets requirements for this alternative. Reduction in the ability of the Decision Area to maintain a local population is minimal when compared to existing conditions.

ALTERNATIVE EH

This alternative would maintain nesting habitat at existing levels. There would be some impact due to 75 acres of seed tree harvest. It would result in a reduction of potential nesting habitat by 0.2 percent, from 25.1 percent to 24.9 percent. Feeding habitat would be reduced by 1.1 percent from 56.7 percent to 55.6 percent, which is still within recommended guidelines.

This alternative differs from Alternative E by the addition of helicopter logging units. Because these units are located below 5000 feet in elevation they would not impact boreal owl habitat. Similar to Alternative E, this alternative would have a minimal impact on boreal owl habitat. The amount of suitable nesting stands would be slightly reduced. Foraging habitat meets requirements for this alternative. Reduction in the ability of the Decision Area to maintain a local population is minimal when compared to existing conditions.

ALTERNATIVE H

This alternative would clearcut 125 acres and utilize seed tree harvest on 50 acres. The result would be a reduction of potential nesting habitat by 1.9 percent, from 25.1 percent to 23.2 percent; including loss of 14 acres of old growth. Foraging habitat would be reduced by 3.7 percent, from 56.7 percent to 53.0 percent, which stays within the recommended guidelines.

This alternative would harvest 14 acres of old growth spruce-fir which reduces potential nesting habitat. Loss of nesting stands is significant under this alternative and may contribute to a decline in the local population.

ALTERNATIVE I

This alternative would clearcut 45 acres and use 70 acres of seed tree harvest. The result would be a reduction of potential nesting habitat by 1.0 percent, from 25.1 percent to 24.1 percent. Foraging habitat would be reduced by 2.6 percent, from 56.7 percent to 54.6 percent, still within the recommended guidelines.

This alternative would further reduce nesting habitat below the recommended threshold level necessary to maintain a local population. Loss of nesting stands under this alternative may contribute to a decline in the local population.

ALTERNATIVE J1

This alternative would seed tree harvest 60 acres. Though it would maintain nesting habitat at existing levels; it would result in a reduction of potential nesting habitat by 0.3 percent, from 25.1 percent to 24.8 percent. Foraging habitat would be reduced by 1.0 percent, from 56.7 percent to 55.7 percent, which is above the foraging habitat threshold.

There would be a minimal reduction of nesting habitat and foraging habitat needs are met by this alternative. Therefore, reduction in the ability of the Decision Area to maintain a local population is minimal when compared to existing conditions.

ALTERNATIVE J2

This alternative would seed tree harvest 85 acres. This would result in a reduction of potential nesting habitat by 1.5 percent, from 25.1 percent to 23.6 percent. Foraging habitat would be reduced by 2.4 percent, from 56.7 percent to 54.3 percent, which is above the foraging habitat threshold.

Loss of nesting stands under this alternative may contribute to a decline in the local population.

ALTERNATIVE J2H

This alternative differs from J2 by the addition of helicopter salvage units. These units are located in areas below 5,000 feet in elevation and would not influence boreal owl habitat.

The rest of the effects from this alternative are the same as shown under Alternative J2. There would be a reduction of potential nesting habitat by 1.5 percent, from 25.1 percent to 23.6 percent. Foraging habitat would be reduced by 2.4 percent, from 56.7 percent to 54.3 percent, which is above the foraging habitat threshold. Reduction in nesting and foraging habitat is due to 85 acres of seed tree harvest.

Loss of nesting stands under this alternative may contribute to a decline in the local population.

ALTERNATIVE K

This alternative maintains nesting and foraging habitat at existing levels. Harvesting planned for stands within the potential owl habitat zone includes basal area thinning and the group selection form of uneven-aged management. The thinning would be applied to some stands that now provide foraging habitat. This would not significantly change the foraging characteristics of these stands.

Group selection would be prescribed in some potential nesting stands. As the first entry of this harvest system, there would be no effect on nesting habitat potential (Hayward, 1991). Use of a long-conversion prescription may allow a portion of the stand to develop old-growth characteristics suitable for owl nesting habitat.

There would be no change in the ability of the Decision Area to maintain a local population as compared to existing conditions.

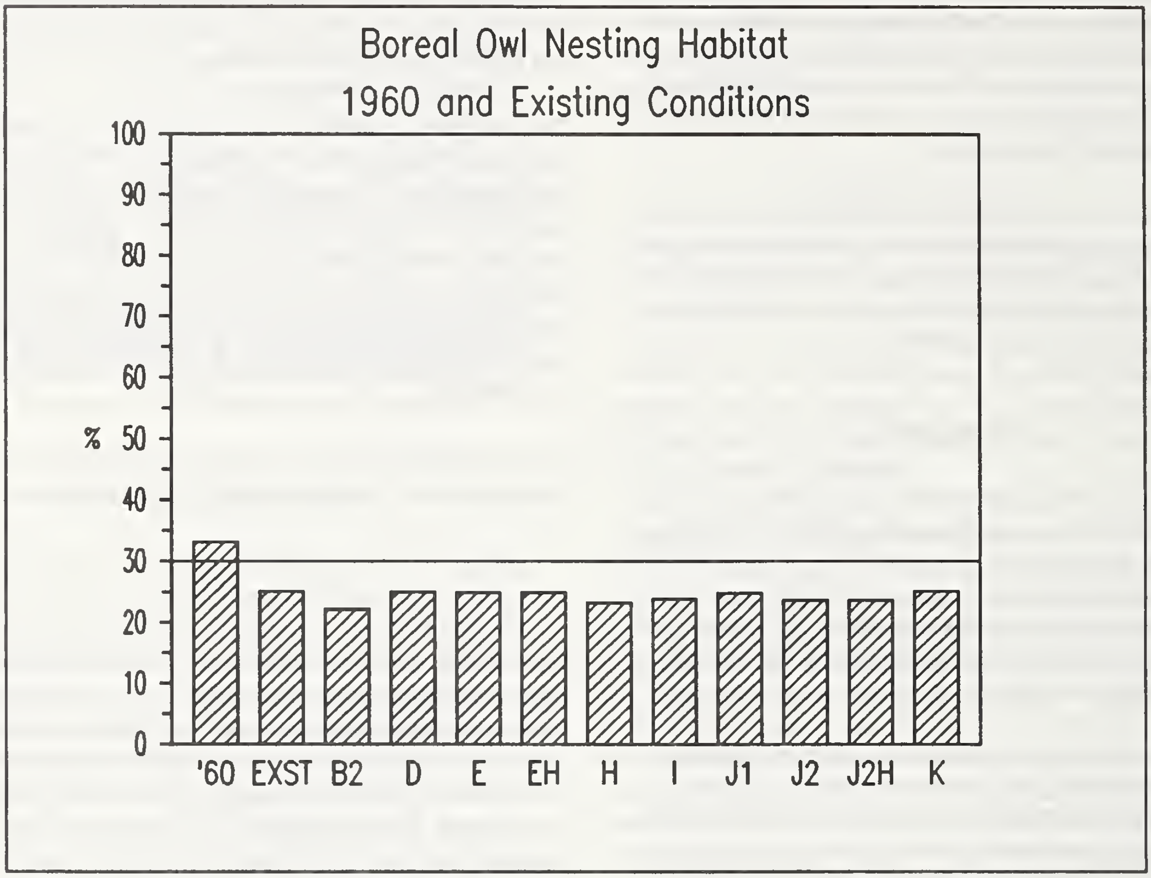


FIGURE 4-98 displays the Boreal Owl Nesting Habitat conditions in 1960, the Existing Condition (Alt A), and the potential condition under each Alternative.
The 30% reference line indicates the tentative recommended threshold level for an unmanaged situation.

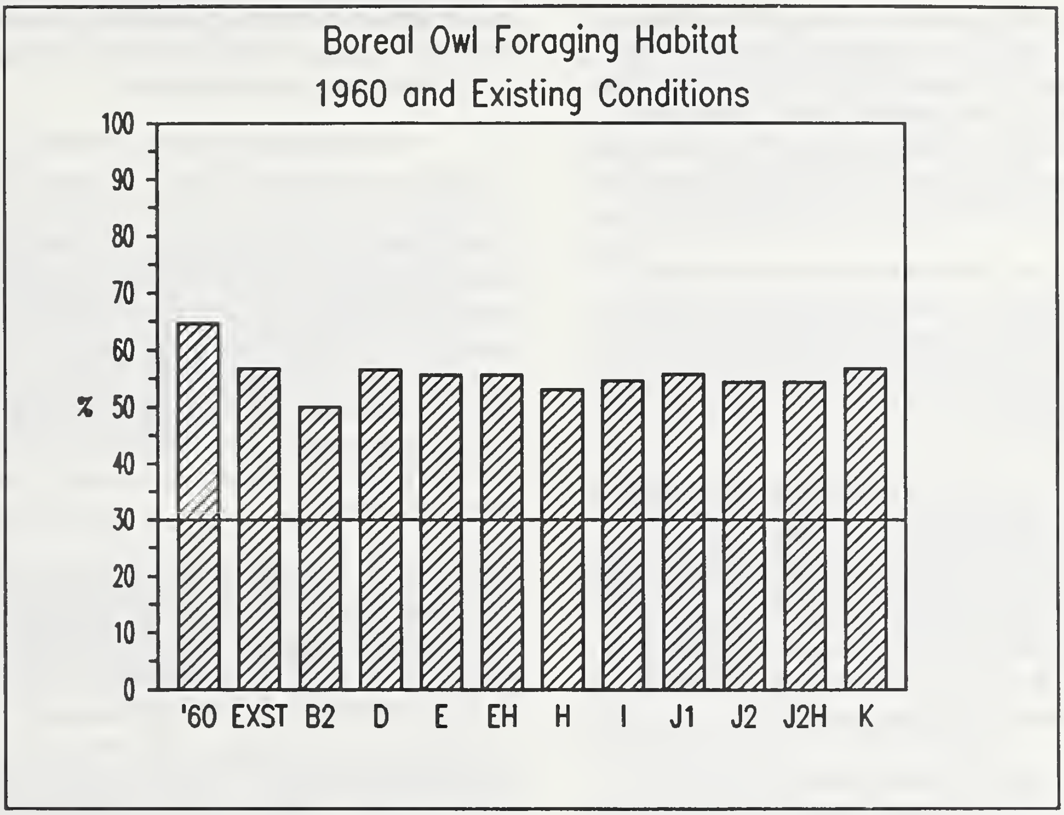


FIGURE 4-99 displays the Boreal Owl Foraging Habitat conditions in 1960, the existing condition (Alt A), and the potential condition under each Alternative.
Fifty percent is the tentative recommended threshold level for an unmanaged situation.

NORTHERN GOSHAWK
(*Accipiter gentilis*)

IPNF Status: Management Indicator species

Nesting habitat is considered the primary limiting factor to reproductive success of goshawks. The Habitat Suitability Index (HSI) model was used to assess existing and predicted stand conditions within the Decision Area for suitability as goshawk habitat (see the project files). The HSI was developed by Region One of the Forest Service.

Four ecological characteristics were evaluated to provide an index to nesting and feeding habitat values for individual stands and multiple stand analysis areas. These characteristics are canopy closure, dominant overstory species, size of nest stand, and slope.

Canopy closure is the characteristic most affected by harvest prescriptions. Goshawk values are highest in stands that have 70 percent or greater canopy closure. Stands between 40 and 70 percent canopy closure offer less than half the value of stands containing over 70 percent canopy closure. Stands under 40 percent canopy closure offer very little, if any, value for goshawk.

Therefore, harvest prescriptions that reduce canopy closure below 40 percent have the greatest effect on goshawk values. These include clearcut, seed tree, shelterwood, overstory removal, and some sanitation salvage harvest units. Practically all harvest prescriptions for stands that currently have a canopy closure over 70 percent would reduce the canopy closure below 70 percent. Light sanitation salvaging would be the only exception. (HSI model documentation in the project file contains values of model variables.)

The recommended guideline for maintaining a goshawk population is to provide suitable habitat for a least one pair of goshawks per 10,000 acres (USDA Forest Service, 1989c). For the purpose of this analysis, the maintenance of two potential goshawk territories within the 20,673 acre Decision Area would meet this recommendation.

Only the portions of Old Growth Management (OGM) units which overlap the Decision Area have been analyzed. Four analysis units have been identified. Analysis unit 1 is the segment of OGM unit 23 which is inside the Decision Area. Analysis units 2 and 3 divide OGM unit 25 which is totally within the Decision Area. Analysis unit 4 is part of OGM unit 30. Because most of OGM unit 30 is outside the Decision Area, there is insufficient acreage within analysis unit 4 to make it a suitable goshawk study area.

EFFECTS COMMON TO ALL ALTERNATIVES

All alternatives would retain a sufficient number of suitable nesting stands to support one pair of breeding goshawks within each of the habitat analysis units. In analysis units 1 and 3 feeding habitat is currently below threshold levels necessary to provide sufficient habitat to maintain a pair of nesting goshawks. Goshawk unit 2 currently provides habitat necessary to maintain a pair of nesting goshawks.

Direct effects of timber harvesting are a reduction in the quantity and quality of nesting and feeding habitat available to goshawks. Indirect effects would be the result of the goshawk's reduced ability to occupy the habitat units.

Goshawks are sensitive to disturbance near their nesting stands (Wilson, 1989). Activity near an active nest site may result in abandonment of the nest.

Management recommendation for maintaining a viable goshawk population is to provide suitable habitat for at least one nesting pair on each 10,000 acre management unit (USDA Forest Service, 1989c).

Due to past management activities, analysis unit 1 does not contain sufficient feeding habitat to support a nesting pair of goshawks. Analysis unit 1 is the 44 percent of OGM unit 23 which lies within the Decision Area. The suitability of the remaining portion of OGM unit 23 as potential goshawk nesting habitat is unknown. Additional timber harvesting in this goshawk unit would not affect the ability of the remainder of OGM unit 23 to support a pair of goshawk, since goshawk unit one is isolated from the remainder of the OGM unit.

Old-Growth Management Unit 25 (goshawk analysis units 2 and 3) currently contains suitable habitat in goshawk unit 2 to provide for a pair of nesting goshawk. Alternatives that eliminate the ability of this unit to provide suitable goshawk habitat would not meet the regional recommendations.

Possible Effects of Other Jurisdictions

Within the Decision Area, stands with the highest nesting values are located in the low elevation areas adjacent to private land. Disturbance activities on these lands, such as development and timber harvesting, may influence nesting success. However, as discussed in Chapter 3 (page 3-40), topographical features provide some isolation for these stands.

Consistency With the Forest Plan

Forest Plan standards state that the IPNF would "maintain at least minimum viable populations of management indicator species distributed throughout the Forest" (Forest Plan, p. II-28). To maintain a viable population of goshawks, it is recommended that suitable habitat for at least one pair should be provided within each 10,000 acre analysis unit (USDA Forest Service, 1989c).

ALTERNATIVE A

Alternative A, the No Action alternative, would have no direct effects on goshawk habitat within the Decision Area. Goshawk habitat analysis units 1 and 3 each have an average Feeding Habitat Suitability Index (FHSI) below the minimum index of .50 required to support one breeding pair of goshawks. Analysis unit 2, with a feeding index of .53, exceeds the minimum level.

Each of the three analysis units would retain several suitable nesting stands. The Nesting Habitat Suitability Index (NHSI) would be .78 for unit 1, .76 for unit 2, and .78 for unit 3. Total amount of suitable nesting habitat (NHSI greater than .50) within each analysis unit would be 2891 acres in unit 1, 2416 acres in unit 2, and 1147 acres in unit 3.

Additional analysis between the Draft EIS and Final EIS revealed that goshawk analysis unit 2 would be effected by a mountain pine beetle epidemic. Such an epidemic is predicted as highly probable within the next 10 to 15 years (see chapter 3, page 3-71). In the event of the loss of the lodgepole pine stands, the feeding value for goshawk unit 2 would be reduced to .48. This is below the recommended minimum index of .50. This could make the analysis unit unsuitable for goshawk, and the entire Decision Area unsuitable to maintain any goshawks.

Consistency With the Forest Plan

Alternative A would provide suitable habitat for one nesting pair of goshawks in analysis unit 2. This alternative would not immediately change the contribution of the Decision Area towards maintaining a population of goshawks. However, if the mountain pine beetle epidemic does occur, the Decision Area may no longer contribute toward maintaining the goshawk population.

TABLE 4-5

GOSHAWK HABITAT SUITABILITY INDEX (HSI) ANALYSIS

ALT. #	ANALYSIS UNIT 1		ANALYSIS UNIT 2		ANALYSIS UNIT 3	
	Feeding Value	Nesting Value	Feeding Value	Nesting Value	Feeding Value	Nesting Value
A	49	78	53	76	49	78
B2	45	78	46	75	46	78
D	48	78	51	75	49	78
E	48	78	52	75	48	78
EH	47	78	49	66	46	78
H	46	78	50	75	47	78
I	47	78	51	75	48	78
J1	46	78	51	76	46	78
J2	46	78	49	66	46	78
J2H	46	78	47	66	45	78
K	47	78	50	66	45	78

ALTERNATIVE B2

Alternative B2 would have the greatest effect on goshawk habitat. All analysis units would be reduced below minimum feeding habitat levels required to support a breeding pair of goshawks. The FHSI value for units one, two, and three would be reduced to .45, .46, and .46 respectively. Total nesting acres for units one, two and three would be reduced to 2401, 1682 and 1011 acres. The effects of the proposed actions in Alternative B2 would be to make the entire Decision Area unsuitable as goshawk habitat.

Most of the highest value nesting stands in analysis unit 2 would be harvested in this alternative. These stands are located along the eastern edge of the unit. Suitable nesting stands would be maintained farther up Bussard Creek, however they are of less value than the ones that would be eliminated. In addition, Alternative B2 would result in timber harvesting within a quarter mile of most remaining potential goshawk nesting stands within the Decision Area. Timber harvesting activities near active nests may greatly reduce nesting success.

Consistency With the Forest Plan

Based on HSI model interpretations, Alternative B2 would not maintain suitable habitat within the Decision Area for goshawk. This is due to a reduction in feeding habitat HSI values and disturbance to potential nesting stands. The alternative would not meet regional recommendations for maintenance of a viable goshawk population (USDA, 1989).

ALTERNATIVE D

Alternative D would reduce feeding habitat in goshawk analysis units one and two. The FHSI value would be reduced to .48 in unit 1, .51 in unit 2, and .49 in unit 3. Total nesting acres for units one, two and three would be reduced to 2521, 1732 and 1096 acres. Based on HSI model interpretations, this alternative would not result in a change to the ability of goshawk analysis unit 2 to provide habitat for one nesting pair of goshawks.

Alternative D would result in timber harvesting within a half mile of most high value potential goshawk nesting stands within the Decision Area. The nesting value of these stands would be maintained however, due to the nature of the prescribed harvesting (sanition/salvage and basal area thinning). The highest value nesting stand just west of Bussard Lake would not be disturbed.

Consistency With the Forest Plan

Alternative D would provide suitable habitat for one nesting pair of goshawks in goshawk analysis unit 2. This alternative would not change the contribution of the Decision Area towards maintaining a population of goshawks.

ALTERNATIVE E

Alternative E would reduce the feeding habitat quality for all three analysis units. The FHSI for units one and three, currently below the minimum index of .50, would both be reduced to .48. The FHSI value for unit 2, although reduced, would be maintained above minimum levels at .52. Total nesting acres for units one, two and three would be reduced to 2629, 2294 and 1219 acres.

The effects of the activities proposed in this alternative would be minimal, with only slight reductions in goshawk habitat quality.

Alternative E would have minimal indirect effects. The disturbance caused by management activities would have little effect on goshawks.

Consistency With the Forest Plan

Alternative E would provide suitable habitat for one nesting pair of goshawks in goshawk unit 2. This alternative would not immediately change the contribution of the Decision Area towards maintaining a population of goshawks.

ALTERNATIVE EH

Alternative EH would reduce all analysis units below minimum feeding habitat levels required to support a breeding pair of goshawks. The FHSI value would be reduced to .47 in unit one, .49 in unit two, and .46 in unit three . Total nesting acres for units one, two, and three would be reduced to 2407,1964, and 1064 acres.

The effects of Alternative EH would negatively impact the suitability of goshawk nesting habitat within the Decision Area.

Alternative EH would result in timber harvesting within a quarter mile of most high value potential goshawk nesting stands within the Decision Area. Disturbance from these activities would likely displace any nesting pair of goshawks in analysis unit 2.

Consistency With the Forest Plan

Based on HSI model interpretations, Alternative EH would not maintain suitable goshawk habitat within the Decision Area. This is due to a reduction in feeding habitat HSI values and disturbance of nesting stands. The alternative would not meet regional recommendations for maintenance of a viable goshawk population (USDA, 1989).

ALTERNATIVE H

Alternative H would reduce the feeding habitat quality for all three analysis units. The FHSI for units 1 and 3, currently below the minimum FHSI index of .50, would be reduced to .46 and .47 respectively. The FHSI value for unit 2, although reduced by this alternative, would be maintained at the .50 threshold level necessary to provide suitable feeding habitat. Total feeding acres for units one, two, and three would be reduced to 2507, 1958 and 1168 acres.

The effects of the proposed management activities would be to reduce goshawk habitat suitability in analysis unit 2 to just above the minimum levels necessary to support a pair of nesting goshawks.

Alternative H would result in timber harvesting within a half mile of most potential goshawk nesting stands within the Decision Area. The highest value stand west of Bussard Lake would be maintained as suitable nesting habitat. However harvesting in the adjacent stand may displace any nesting goshawk. A large area of nesting habitat would be maintained in the Bussard Creek block of nesting stands.

Consistency With the Forest Plan

Alternative H would provide suitable habitat for one nesting pair of goshawks in goshawk analysis

unit 2. This alternative would not change the contribution of the Decision Area towards maintaining a population of goshawks.

ALTERNATIVE I

Alternative I would reduce the feeding habitat quality for all three analysis units. The FHSI for units 1 and 3, currently below the minimum FHSI index of .50, would be reduced to .47 and .48 respectively. The FHSI value for unit 2, although reduced by this alternative, would be maintained above minimum levels at .51. Total nesting acres for units one, two and three would be reduced to 2621, 1976 and 1177 acres.

The effects of the proposed management activities would be to reduce goshawk habitat suitability in analysis unit 2 to minimum levels necessary to support a pair of nesting goshawks.

Alternative I would result in timber harvesting within a half mile of most potential goshawk nesting stands within the Decision Area. The highest value nesting stand west of Bussard Lake would not be disturbed, as would most of the higher value nesting stands in goshawk unit 2. However, there would be some potential for displacement from harvest operations.

Consistency With the Forest Plan

Alternative I would provide suitable habitat for one nesting pair of goshawks in goshawk analysis unit 2. This alternative would not change the contribution of the Decision Area towards maintaining a population of goshawks.

ALTERNATIVE J1

Alternative J1 would reduce the feeding habitat quality for all three analysis units. The FHSI for units 1 and 3, currently below the minimum FHSI index of .50, would be reduced to .46. The FHSI value for unit 2, although reduced by this alternative, would be maintained above minimum levels at .51. Total nesting acres for units one, two, and three would be reduced to 2405, 2016 and 1111 acres.

The effects of the proposed management activities would be to reduce goshawk habitat suitability in analysis unit 2 to just above the minimum levels necessary to support a pair of nesting goshawks.

Alternative J1 would result in timber harvesting within a quarter mile of most potential goshawk nesting stands within the Decision Area. The highest value nesting stand just west of Bussard Lake would not be disturbed. In addition, all nesting stands above the Sidehill Trail south of Bussard Creek would not be disturbed. However, timber harvesting activities near active nest sites may reduce nesting success.

Consistency With the Forest Plan

Alternative J1 would provide suitable habitat for one nesting pair of goshawks in goshawk analysis unit 2. This alternative would not change the contribution of the Decision Area towards maintaining a population of goshawks.

ALTERNATIVE J2

Alternative J2 would reduce all analysis units below minimum feeding habitat levels required to support a breeding pair of goshawks. The FHSI value would be reduced to .46 in unit 1, .49 in unit 2, and .46 in unit 3. Total nesting acres for units one, two, and three would be reduced to 2405, 1904 and 1032 acres.

The effects of the management activities would negatively impact the suitability of goshawk nesting habitat within the Decision Area.

Alternative J2 would result in timber harvesting within a quarter mile of most potential goshawk nesting stands within the Decision Area. The highest value nesting stand in goshawk unit two, just west of Bussard Lake, would not be disturbed. However, timber harvesting activities near active nest sites may reduce nesting success.

Consistency With the Forest Plan

Based on HSI model interpretations, Alternative J2 would not maintain suitable habitat within the

Decision Area for goshawk. This is due to a reduction in feeding habitat HSI values. The alternative would not meet regional recommendations for maintenance of a viable goshawk population (USDA, 1989).

ALTERNATIVE J2H

Alternative J2H would reduce all analysis units below minimum feeding habitat levels required to support a breeding pair of goshawks. The FHSI value would be reduced to .46 in unit one, .47 in unit two, and .45 in unit 3. Total nesting acres for units one, two and three would be reduced to 2405, 1370 and 857 acres.

The effects of the proposed actions in Alternative J2H would be similar to the effects in Alternative J2. Alternative J2H would result in timber harvesting within a quarter mile of nearly all of the potential goshawk nesting stands within the Decision Area. The highest value nesting stand in goshawk unit two would not be disturbed. However, timber harvesting activities, especially repeated trips with helicopters, near active nest sites may reduce nesting success.

Consistency With the Forest Plan

Based on HSI model interpretations, Alternative J2H would not maintain suitable habitat within the Decision Area for goshawk. This is due to a reduction in feeding habitat HSI values. The alternative would not meet regional recommendations for maintenance of a viable goshawk population (USDA, 1989).

ALTERNATIVE K

Alternative K would reduce the feeding habitat quality for all three analysis units. The FHSI for units 1 and 3, currently below the minimum FHSI index of .50, would be reduced to FHSI value of .47 and .45, respectively. The FHSI value for unit 2, although reduced by this alternative, would be maintained at the minimum level of .50. Total feeding acres for units one, two and three would be reduced to 2432, 1699 and 834 acres.

The effects of the proposed management activities would be to reduce goshawk habitat suitability in analysis unit 2 to minimum levels necessary to support a pair of nesting goshawks.

Alternative K would result in timber harvesting within a quarter mile of most potential goshawk nesting stands within the Decision Area. The highest value nesting stand just west of Bussard Lake would be entered for timber harvest. The harvest prescription would be the group selection form of uneven-aged management. Because goshawks prefer a closed, even layered canopy the increase in openings due to group selection would, over time, reduce the suitability of this stand for nesting goshawks. Several other potential nesting stands would be left in an unharvested state. However, timber harvesting activities near active nest sites may reduce nesting success and cause displacement

Consistency With the Forest Plan

Alternative K would provide suitable habitat for one nesting pair of goshawks in goshawk analysis unit 2. This alternative would not change the contribution of the Decision Area towards maintaining a population of goshawks.

PINE MARTEN
(*Martes americana*)

IPNF Status: Management Indicator species

The availability of suitable winter habitat is considered the primary limiting factor for pine marten populations. If sufficient winter feeding and cover habitat is available, summer habitat requirements would be met.

The Habitat Suitability Index (HSI) model was used to assess the existing and predicted stand conditions within the Decision Area for suitability as pine marten habitat (see the project files). Six ecological characteristics were evaluated. They are habitat type, dominant overstory species, canopy closure, average overstory, tree diameter breast high (dbh), downed log density, and road

density. They provide multiple stand analysis of the area and an index to feeding and cover habitat values for individual stands.

Harvest prescriptions that result in 30 percent or less canopy closure result in elimination of a stand as suitable pine marten habitat. Such prescriptions include clearcut, seedtree, shelterwood, overstory removal, and sometimes sanitation salvage.

Road density is the most impactive characteristic on martin habitat. Table 4-6 (page 4-117) illustrates the effects of road density on marten habitat (compare the HSI index against the modified HSI index for feeding habitat in analysis units 1 and 2). This reduction in habitat value is due entirely to road density. It is assumed that increasing road densities provide additional opportunities to harvest marten. Based on the HSI model, elimination of marten trapping in these two units would allow this habitat to be utilized.

For multiple stand analysis, the Decision Area was subdivided into eight marten habitat analysis units, each approximately 2000 acres in size. A 1,920 acre analysis unit is considered to be equal to the typical home range of one male and two female martens (USDA Forest Service, 1989c). These analysis units encompass a total of 16,797 acres within the Decision Area. The low elevation areas, considered unsuitable for marten habitat, were excluded from this acreage.

The minimum management guideline within each analysis area for marten feeding habitat is 500 acres and for cover habitat it is 250 acres. Cover habitat was evaluated using Standard Cover Acres. This value was calculated by multiplying the total acres of each suitable timber stand (stands with a cover HSI index equal to or greater than .50) by the HSI index value, and summing these stand values for the entire analysis unit. Standard Feeding Acres is calculated in the same way.

Standard Cover Acres = [(chsi1 X acres1) + (chsi2 X acres2)]

Standard Feeding Acres = [(fhsi1 X acres2) + (fhsi2 X acres2)]

Where:
chsi1 = cover HSI index value for stand 1
chsi2 = cover HSI index value for stand 2
fhsi1 = feeding HSI index value for stand 1
fhsi2 = feeding HSI index value for stand 2
acres1 = total stand 1 acres
acres2 = total stand 2 acres

Several other factors are key to pine marten habitat. It is important that the intervening stands contain corridors of immature to mature timber to provide for movement between core habitat areas. Marten avoid crossing large openings such as clearcuts, especially during the winter (Koehler, 1989). If corridors of timber are unavailable, breeding adult's movement between habitat areas and dispersing by young marten may be greatly reduced.

In order to maintain long-term genetic viability, the species must maintain an effective population size of at least 500 individuals (Jerry, 1983). The Decision Area could support at most 60 marten. Therefore it is crucial that suitable habitat be distributed throughout the Forest to maintain a viable population.

Guidelines adopted by the Forest Service in Region Six (Oregon and Washington) recommend maintaining at least one suitable marten habitat block for each 4,000 to 5,000 acre management unit across the entire forest. This would insure that an area of suitable marten habitat be separated by a distance of no more than three miles from other suitable areas, allowing for successful dispersal (USDA Forest Service, 1989c).

Road density is another important factor in marten habitat. High road density increases the risk of pine marten mortality due to trapping and reduces cover. The effects of increased access were evaluated using road density values in the calculation of the Habitat Suitability Index from which standard cover acres are derived.

EFFECTS COMMON TO ALL ALTERNATIVES

All alternatives would retain sufficient habitat in each of the eight marten analysis units to exceed the minimum 500 standard feeding acres required to provide suitable marten feeding habitat.

As a result of previous management activities, marten analysis units number one and two on the northern end of the Decision Area do not meet the minimum 250 standard cover acres. Cover in these units is 203 acres in unit one, and 169 acres in unit two. Road construction and regeneration harvesting conducted during the Hellroaring Timber Sales are responsible for this reduction.

TABLE 4-6

Pine Marten Existing Habitat Quality and Acreages

		Feeding Habitat		Cover Habitat		
Analysis Unit	Total Acres	HSI Index	Standard Acres	HSI Index	Modified HSI Index	Standard Acres
1	2200	64	972	59	12	203
2	1731	61	930	55	11	169
3	2233	61	1118	62	43	760
4	1958	57	775	70	49	672
5 *	2401	60	1330	63	63	1477
6	1880	66	924	66	46	638
8	2743	64	1112	59	41	749
9	1651	65	898	71	71	986

* Analysis Unit number 7 was too small for adequate analysis by the HSI model. For this EIS it was combined with Analysis Unit number 5.

In all alternatives, travel corridors are retained along the northern, eastern, southern, and western boundaries (see Interior Forest Habitat Map, Chapter 3 page 3-56). Adequate travel corridors exist on National Forest Lands to insure that breeding interchange between pine marten within the Decision Area and adjacent populations will be maintained. These corridors provide an opportunity for pine marten to disperse from adjacent lands into the Decision Area, increasing the genetic diversity of the local marten population.

The IPNF Forest Plan does not identify, for protection, specific travel corridors for breeding interchange of pine marten. Regulation 36 CFR 219.19 requires that habitat be provided to allow breeding interchange between local populations within the Forest or Regional planning area. The travel corridors discussed above were identified as a function of the site specific planning and analysis to insure that this opportunity for breeding individual interchange would be maintained.

Within the Decision Area there are no restrictions on winter access by snowmobiles. Unlimited access, especially in the Hellroaring drainage where road densities are relatively high, increases the risk of pine marten mortality due to trapping. Higher road densities are one of the major factors in reduction of standard cover acres on analysis units one and two.

Possible Effects of Other Jurisdictions

Pine marten populations are very susceptible to over harvesting. In high quality habitats, fur trappers typically remove 35 to 40 percent of the population annually (Hash, 1989a). Current Idaho trapping regulations do not restrict the number of marten harvested, but do regulate the length of the season (Hanna, 1989). Because marten populations are affected by harvest levels, Idaho Department of Fish and Game trapping regulations influence the pine marten population inhabiting the Decision Area.

Cumulative Effects

Maintaining genetic viability requires an effective population size of at least 500 breeding adults (Jerry, 1983). Typical pine marten densities in suitable habitat vary between one and three animals per square mile (Patton, 1981). Assuming similar densities are representative of pine marten populations in northern Idaho, the 12,866 acres of suitable habitat within the Decision Area could potentially support between 20 and 60 individuals. Even at maximum densities, the Decision Area alone is far too small to support a self-sustaining pine marten population. Therefore, habitat quality must be evaluated over a much larger area.

To maintain viable pine marten populations across the Forest, suitable habitat must be distributed in a manner that allows interchange of individuals between habitat patches (USDA Forest Service, 1989c). Marten are capable of traveling five to six miles during breeding or dispersal (Hash, 1989a). A three mile spacing of habitat areas appears appropriate (USDA Forest Service, 1989c). Future management activities on lands adjacent to the Decision Area could alter habitat distribution or eliminate corridors between habitat patches, reducing habitat suitability.

Construction of new roads in these areas would provide increased opportunity for winter access by fur trappers; further reducing habitat effectiveness for pine marten. These and other and future management activities occurring within the Decision Area or the immediate vicinity, may result in a reduction of the local population.

Consistency With the Forest Plan

The IPNF Forest Plan designates the pine marten as an old growth Management Indicator species. Forest Plan Standards require that the Forest "maintain at least minimum viable populations of Management Indicator species distributed throughout the Forest" (Forest Plan, p. II-28).

The Decision Area is incapable of supporting a fully self-sustaining population of martens; based on its size. Nevertheless, the area is capable of supporting a local population and contains travel corridors that contribute to the population on the Forest. This analysis addresses the effects of actions on the local population only.

ALTERNATIVE A

Alternative A, the No Action alternative, has no direct effects on pine marten habitat within the Decision Area. The existing habitat and movement corridors would be maintained at current levels. Due to prior management activities, analysis units one and two do not meet the minimum 250 standard cover acres, and are unsuitable as pine marten habitat due to the open road density.

The remaining six analysis units exceed minimum requirements for standard cover acres. This alternative would maintain 77 percent of the potential habitat in a condition suitable to support pine marten.

The proposed activities in Alternative A would not require any new road construction, and therefore, the risk of trapping mortality would not increase.

Alternative A would have no effect on the pine marten population within the Decision Area. However, extensive management activities outside the Decision Area could have major effects on the viability of the local pine marten population. If suitable habitat patches are not distributed evenly throughout the area, or movement corridors are eliminated, the marten habitat within the Decision Area could be isolated, potentially eliminating the local marten population.

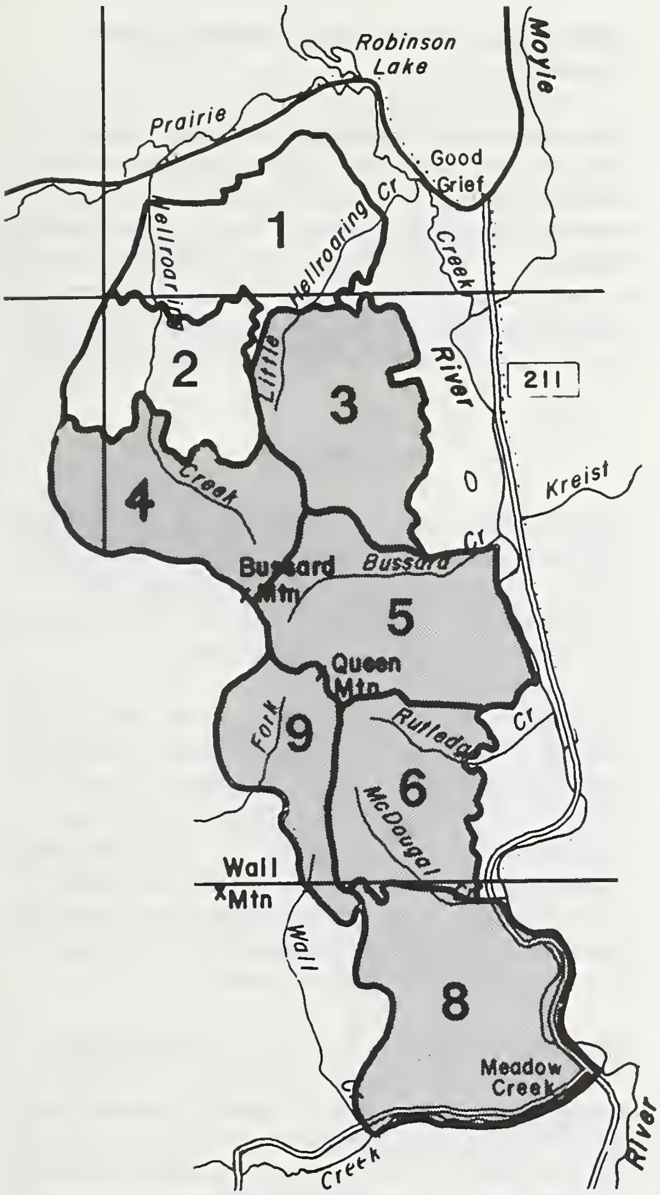


FIGURE 4-100 outlines the Pine Marten Analysis Units within the Decision Area. Units 1 and 2 in the northern portion of the area currently do not meet the minimum standards for suitable habitat due to past activities. The remaining six units are capable of supporting at least one male and two female martens. **This map represents the effects of Alternatives A, E, EH, I, J1, J2, J2H, and K.**

Unit 7 was combined with unit 5 for analysis purposes.

ALTERNATIVE B2

Alternative B2 would retain only 52 percent of the potential habitat in conditions suitable for pine marten. This habitat would be concentrated in the southern half of the Decision Area, leaving the northern half unsuitable for pine marten.

Of all actions alternatives, B2 would have the greatest effect on pine marten habitat, retaining only four suitable analysis units. It would reduce standard cover acres for analysis unit two to zero. In addition to analysis units one and two, units three and four would not meet the 250 acre minimum level for standard cover acres. Standard cover acres for unit three would be reduced to 206 acres and unit four to 181 acres. Of the remaining four analysis units (all of which exceed standard cover acre requirements), only unit nine would show a major reduction, decreasing to 614 acres.

The portions of OGM units 25 and 30 included in the Decision Area maintain suitable habitat and distribution to support pine marten. However, the 8122 acre block of unsuitable habitat lies primarily in OGM unit 23. The 7208 acres of this unit within the Decision Area do not contain any suitable marten habitat patches, and do not meet the recommended distribution pattern of one marten habitat patch for each 4,000 to 5,000 acre management unit.

The proposed activities in Alternative B2 would result in the construction of 20.5 miles of new road within the Decision Area, increasing the risk of trapping mortality. The effects of increased access were evaluated using road density values in the calculation of a Habitat Suitability Index from which standard cover acres are derived.

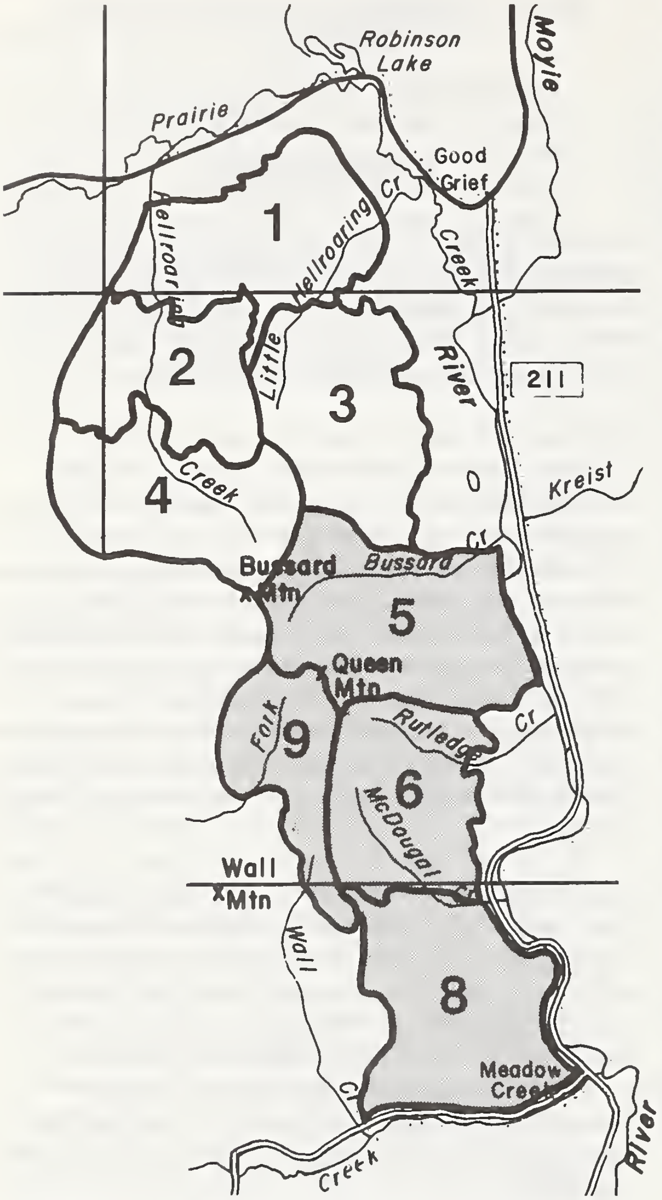


FIGURE 4-101 displays the effect of Alternative B2. It would result in the southern four analysis units being capable of supporting at least one male and two female marten. Analysis unit 7 was combined with 5 for analysis purposes.

The management activities proposed for Alternative B2 would result in the northern four analysis units becoming unsuitable as pine marten habitat. These analysis units would not provide suitable cover habitat for pine marten due primarily to high road densities and secondarily to extensive timber harvesting.

Due to increased potential for trapping, these four units create a four mile block of unsuitable habitat that may restrict or eliminate movement of pine marten between the Decision Area and potential habitat to the north. If future management activities further isolate the Decision Area from other areas of suitable marten habitat, the potential for maintaining a local population would be greatly reduced.

ALTERNATIVE D

Alternative D would retain 63 percent of the potential habitat in conditions suitable for pine marten. This habitat would be concentrated in the southern portion of the Decision Area, leaving the northern 37 percent unsuitable for pine marten.

Alternative D would retain five analysis units which provide suitable habitat for pine marten. Analysis units one and two do not meet the 250 acre minimum level for standard cover acres under existing conditions, and would not be significantly changed by this alternative. Analysis unit three would be reduced to 212 acres. All of the remaining five analysis units would exceed minimum levels required for standard cover acres.

The portions of OGM units 25 and 30 included in the Decision Area maintain suitable habitat and distribution to support pine marten. However, the 6164 acre block of unsuitable habitat lies primarily in OGM unit 23. The 7208 acres of this unit within the Decision Area contain only one suitable marten habitat patch, and do not meet the recommended distribution pattern of one marten habitat patch for each 4,000 to 5,000 acre management unit.

The proposed activities in Alternative D would result in the construction of 7.7 miles of new road within the Decision Area, increasing the risk of trapping mortality. The effects of increased access were evaluated using road density values in the calculation of a Habitat Suitability Index from which standard cover acres are derived.

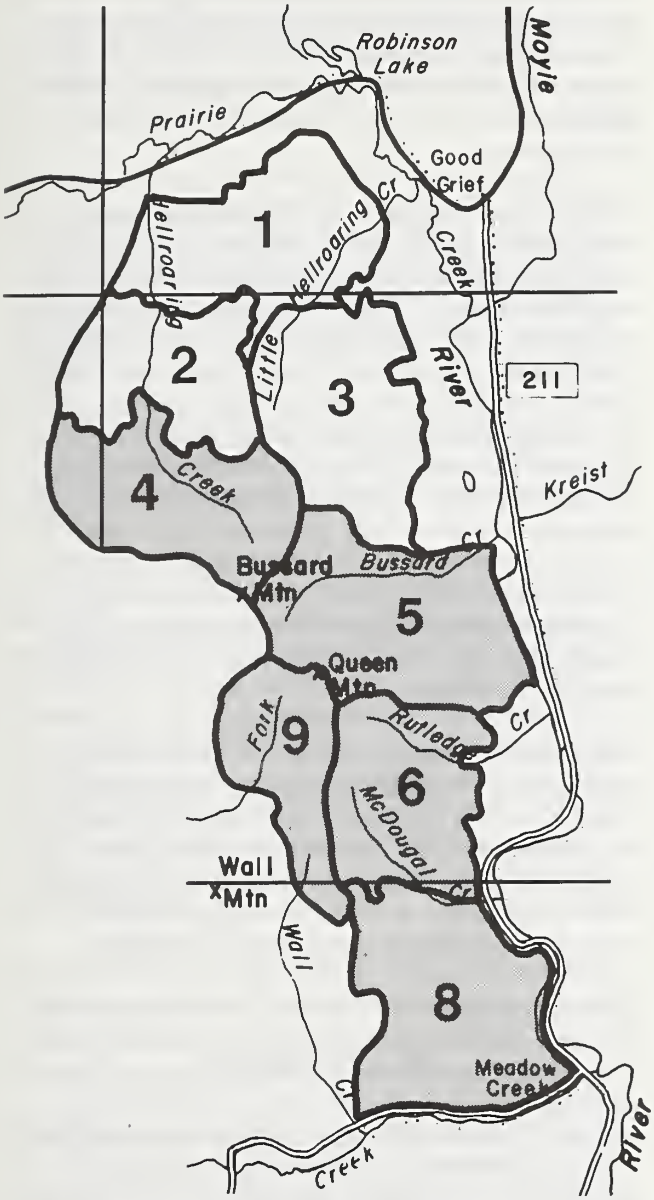


FIGURE 4-102 shows the effects of Alternatives D and H. They would both result in five analysis units being capable of supporting at least one male and two female pine martens. Analysis unit 7 was combined with unit 5 for analysis purposes.

The management activities proposed for Alternative D would result in the northern three analysis units becoming unsuitable as pine marten habitat. These analysis units would not provide suitable cover habitat for pine marten due primarily to the high road densities and secondarily to timber harvesting. Additionally, these three units would create a zone of unsuitable habitat three and one half miles wide, which could act as a barrier to dispersing martens due to increased potential for trapping. Future management activities would further isolate the Decision Area from other areas of suitable habitat, decreasing the potential for retaining a viable local population.

ALTERNATIVE E

Alternative E would have minimal effect on pine marten habitat within the Decision Area. The standard cover and feeding acre values for all marten analysis units would remain essentially unchanged (within ten percent) from the existing conditions. Six of the eight analysis units, or 77 percent of the available habitat, would provide suitable pine marten habitat.

The proposed activities in Alternative E would not require any new road construction, and therefore, the risk of trapping mortality would not increase.

Alternative E would have no effect on the pine marten population within the Decision Area. The existing habitat and movement corridors would be maintained at current levels.

Due to high road densities and previous harvesting, analysis units one and two do not provide sufficient cover habitat to support pine marten. Additionally, these two units create a zone of unsuitable habitat two miles wide, which may act as a barrier for dispersing pine marten due to increased potential for trapping.

See Alternative A Map Figure 4-100, page 4-119.

ALTERNATIVE EH

Alternative EH would have minor effects on the pine marten population within the Decision Area. Both feeding and cover habitat quality would be reduced in most analysis units, but would still maintain adequate habitat to support pine marten in all but units one and two. However, increased road densities would result in a slightly greater risk of trapping mortality.

The effects of the actions proposed in Alternative EH would not reduce the availability of existing marten habitat. This alternative would retain 77 percent of the potential marten habitat within the Decision Area. Six analysis units would retain their ability to provide suitable habitat for pine marten. Analysis units one and two do not meet the 250 acre minimum level for standard cover acres under existing conditions, and would not be significantly changed by this alternative.

The proposed activities in Alternative EH would not result in the construction of new roads, and therefore, the risk of trapping mortality would not increase.

Although habitat quality is maintained, extensive management activities outside the Decision Area could have major influence on the viability of the local pine marten population. If suitable habitat patches are not distributed evenly throughout the area, or movement corridors are eliminated, the marten habitat within the Decision Area could be isolated. This could potentially eliminate the local marten population.

Alternative EH would have no additional effect on analysis units one and two in the northern end of the Decision Area. These analysis units do not currently contain suitable cover habitat for pine marten. They do not meet the standard cover minimum requirement of 250 acres, due primarily to the high road densities and secondarily to prior regeneration harvesting. These two units would create a zone of unsuitable habitat two miles wide, which could act as a barrier to dispersing pine marten.

See Alternative A Map Figure 4-100, page 4-119.

ALTERNATIVE H

Alternative H would retain 63 percent of the potential habitat in conditions suitable for pine marten. This habitat would be concentrated in the southern portion of the Decision Area, leaving the northern 37 percent unsuitable for pine marten.

Alternative H would retain five analysis units that provide suitable habitat for pine marten. Analysis units one and two do not meet minimum levels for standard cover acres under existing conditions, and would not significantly change in this alternative. Analysis unit three would be reduced to 211 acres. All of the remaining five analysis units would exceed minimum levels required for standard cover acres.

The portions of OGM units 25 and 30 included in the Decision Area maintain suitable habitat and distribution to support pine marten. However, the 6164 acre block of unsuitable habitat lies primarily in OGM unit 23. The 7208 acres of this unit within the Decision Area contain only one suitable marten habitat patch, and do not meet the recommended distribution pattern of one marten habitat patch for each 4,000 to 5,000 acre management unit. Additionally, although travel corridors are present within the northern half, relatively high road densities and associated risk of trapping mortality in this three and one-half mile wide block of unsuitable habitat may restrict movement of pine marten between the Decision Area and potential habitat to the north.

The proposed activities in Alternative H would result in the construction of 12.1 miles of new road within the Decision Area, increasing the risk of trapping mortality. The effects of increased access were evaluated using road density values in the calculation of a Habitat Suitability Index from which standard cover acres are derived.

The management activities proposed for Alternative H would result in the northern three analysis units becoming unsuitable as pine marten habitat. These analysis units would not provide suitable cover habitat for pine marten due primarily to the relatively high road densities and secondarily to timber harvesting. These three units would create a zone of unsuitable habitat three and one-half miles wide, which may act as a barrier for dispersing pine marten due to increased risk of trapping mortality.

See Alternative D Map Figure 4-102, page 4-121.

ALTERNATIVE I

Alternative I would have minimal effect on pine marten habitat within the Decision Area. The standard cover and feeding acre values for all

marten analysis units would remain essentially unchanged from the existing conditions. Six of the eight analysis units, or 77 percent of the available habitat, would provide suitable pine marten habitat.

The proposed activities in Alternative I would result in the construction of 7.6 miles of new road within the Decision Area, increasing the risk of trapping mortality. The effects of increased access were evaluated using road density values in the calculation of a Habitat Suitability Index from which standard cover acres are derived.

The existing habitat and movement corridors would be maintained at current levels. However, higher densities would increase the risk of trapping mortality.

Alternative I would have no additional effect on analysis units one and two in the northern end of the Decision Area. These analysis units do not currently contain suitable cover habitat for pine marten. They do not meet the standard cover minimum requirement of 250 acres, due primarily to the high road densities and secondarily to prior regeneration harvesting. These two units would create a zone of unsuitable habitat two miles wide, which could act as a barrier to dispersing pine marten.

See Alternative A Map Figure 4-100, page 4-119.

ALTERNATIVE J1

Alternative J1 would have a low expected effect on pine marten habitat within the Decision Area. The standard cover and feeding acre values for all marten analysis units would remain essentially unchanged (within ten percent) from the existing conditions. Six of the eight analysis units (77 percent of the available habitat) would provide suitable pine marten habitat.

The proposed activities in Alternative J1 would result in the construction of 7.2 miles of new road within the Decision Area, increasing the risk of trapping mortality.

Existing habitat and movement corridors would be maintained at current levels. However, the increased road densities would result in a slightly greater risk of trapping mortality. If suitable habitat patches are not distributed evenly throughout the area or movement corridors are eliminated, the marten within the Decision Area could become isolated from other populations.

Alternative J1 would have no additional effect on analysis units one and two in the northern end of the Decision Area. These analysis units do not currently contain suitable cover habitat for pine marten. They do not meet the standard cover minimum requirement of 250 acres, due primarily to the high road densities and secondarily to prior regeneration harvesting. These two units would create a zone of unsuitable habitat two miles wide, which could act as a barrier to dispersing pine marten.

See Alternative A Map Figure 4-100, page 4-119.

ALTERNATIVE J2

Alternative J2 would have minimal effect on pine marten habitat within the Decision Area. The standard cover and feeding acre values for all marten analysis units would remain essentially unchanged (within ten percent) from the existing conditions. Six of the eight analysis units (77 percent of the available habitat) would provide suitable pine marten habitat.

The proposed activities in Alternative J2 would result in the construction of 9.7 miles of new road within the Decision Area, increasing the risk of trapping mortality.

The existing habitat and movement corridors would be maintained at current levels. However, an increase in road densities would result in a slightly greater risk of trapping mortality. If suitable habitat patches are not distributed evenly throughout the area, or movement corridors are eliminated, the marten habitat within the Decision Area could be isolated, potentially eliminating the local marten population.

Alternative J2 would have no additional effect on analysis units one and two in the northern end of the Decision Area. These analysis units do not currently contain suitable cover habitat for pine

marten. They do not meet the standard cover minimum requirement of 250 acres, due primarily to the high road densities and secondarily to prior regeneration harvesting. These two units would create a zone of unsuitable habitat two miles wide, which could act as a barrier to dispersing pine marten.

See Alternative A Map Figure 4-100, page 4-119.

ALTERNATIVE J2H

Alternative J2H would have minor effects on the pine marten population within the Decision Area. Both feeding and cover habitat quality would be reduced in analysis units three, five, and six; but these units would still maintain adequate habitat to support pine marten. However, increased road densities would result in a slightly greater risk of trapping mortality.

The effects of the actions proposed in Alternative J2H would not reduce the availability of existing marten habitat. It would retain 77 percent of the potential marten habitat within the Decision Area. Alternative J2H would retain six analysis units which provide suitable habitat for pine marten. Analysis units one and two do not meet the 250 acre minimum level for standard cover acres under existing conditions, and would not be changed significantly by this alternative. Of the six analysis units exceeding cover habitat requirements, Alternative J2H would reduce the standard cover acres for analysis unit three to 678 acres and analysis unit five to 1251 acres.

The proposed activities in Alternative J2H would result in the construction of 9.7 miles of new road within the Decision Area, increasing the risk of trapping mortality. The effects of increased access were evaluated using road density values in the calculation of a Habitat Suitability Index from which standard cover acres are derived.

Although habitat quality is maintained, extensive management activities outside the Decision Area could have major influence on the viability of the local pine marten population. If suitable habitat patches are not distributed evenly throughout the area, or movement corridors are eliminated, the marten habitat within the Decision Area could be isolated, potentially eliminating the local marten population.

Alternative J2H would have no additional effect on analysis units one and two in the northern end of the Decision Area. These analysis units do not currently contain suitable cover habitat for pine marten. They do not meet the standard cover minimum requirement of 250 acres, due primarily to the high road densities and secondarily to prior regeneration harvesting. These two units would create a zone of unsuitable habitat two miles wide, which could act as a barrier to dispersing pine marten.

See Alternative A Map Figure 4-100, page 4-119.

ALTERNATIVE K

Alternative K would have minor effects on the pine marten population within the Decision Area. Both feeding and cover habitat quality would be reduced in most analysis units; but all units that now contain adequate habitat would still maintain sufficient habitat to support pine marten. However, increased road densities would result in a slightly greater risk of trapping mortality.

The effects of the actions proposed in Alternative K would not reduce the availability of existing marten habitat. It would retain 77 percent of the potential marten habitat within the Decision Area. Alternative K would retain six analysis units which provide suitable habitat for pine marten. Analysis units one and two do not meet the 250 acre minimum level for standard cover acres under existing conditions, and would not be changed significantly by this alternative.

The proposed activities in Alternative K would result in the construction of 8.7 miles of new road within the Decision Area, increasing the risk of trapping mortality. The effects of increased access were evaluated using road density values in the calculation of a Habitat Suitability Index from which standard cover acres are derived.

Although habitat quality is maintained, extensive management activities outside the Decision Area could have major influence on the viability of the local pine marten population. If suitable habitat

patches are not distributed evenly throughout the area, or movement corridors are eliminated, the marten habitat within the Decision Area could be isolated, potentially eliminating the local marten population.

Alternative K would have no additional effect on analysis units one and two in the northern end of the Decision Area. These analysis units do not currently contain suitable cover habitat for pine marten. They do not meet the standard cover minimum requirement of 250 acres, due primarily to the high road densities and secondarily to prior regeneration harvesting. These two units would create a zone of unsuitable habitat two miles wide, which could act as a barrier to dispersing pine marten.

See Alternative A Map Figure 4-100, page 4-119.

BIG GAME MANAGEMENT INDICATOR species

Big Game Habitat

ELK (*Cervus canadensis*)

Summer elk habitat was analyzed using Guidelines for Managing Summer Elk Habitat Effectiveness (Leege, 1984). This model incorporates several factors which are found to influence elk. They include: miles of road with and without hiding cover, the type of closure associated with the road, size and distribution of hiding and thermal cover, forage areas, and presence of security areas.

There are no Forest Plan elk habitat management units or targets on the Bonners Ferry Ranger District. The ID Team chose (as recommended by the State of Idaho Dept. of Fish and Game) to develop alternatives that would provide a minimum of 50 percent Elk Habitat Effectiveness (EHE). The desire to achieve this level of EHE is due to the increasing popularity of elk hunting in Boundary County.

The number of miles of standard road per square mile or range is the most influential factor affecting elk habitat effectiveness. Roads constructed through elk habitat and left open for public use with motorized vehicles have a significant influence on animals using the area. Such adverse effects include displacing elk from preferred habitats because of increased disturbance, and the over harvest of elk in localized areas adjacent to roads.

Open roads substantially reduce elk use in adjacent habitat. Roads themselves do not cause this, since closed roads are often preferred by elk as travelways. Usually, the most important factor regulating actual use of habitat by elk is the disturbance caused by people.

Most disturbances originate from roads, both from construction and subsequent use. The degree of disturbance is related to amount of traffic, season of traffic, type of traffic, and amount of buffer available to separate the disturbance from elk. The closure of roads following their construction and use helps to reduce disturbance, but will not eliminate it.

The North Idaho Elk Habitat guidelines model addresses this by applying an effectiveness rating to closure systems. Gating roads is determined to be 70 percent effective in reducing motorized disturbance; closure of roads with barriers is 90 percent effective. In addition, the model adjusts for whether the road is a main road, secondary road, or primitive road. It also adjusts the disturbance based on whether the road is through hiding cover or through forest openings. (See North Idaho Elk Habitat Quidelines in the project file for more information (Leege, 1984)).

Beneficial forage production can result from logging in elk home ranges that have a dense canopy and a limited understory of shrubs, grasses, and forbs. Elk can make heavy use of clearcuts on summer ranges, clearcut sites (also seed-tree and shelterwood with underburning) produce the most palatable elk forage and partial cuts produce the least in the cedar/hemlock zone. Partial cut stands provide neither optimal forage nor cover during the summer period (Leege, 1984).

Hiding cover is an important factor in analyzing elk habitat effectiveness. Hiding cover is defined

as vegetation capable of hiding 90 percent of a standing adult elk from the view of a human at a distance equal to or less than 200 feet during all seasons of the year that elk normally use the area. Timber harvesting that eliminates or substantially reduces hiding cover and provides increased hunter access on newly constructed roads can result in increased elk harvest. Silviculture prescriptions that essentially eliminate hiding cover include all even-aged regeneration systems (clearcut, seed-tree, and shelterwood). Intermediate harvesting (thinnings and sanitation/salvaging) and uneven-aged management can reduce hiding cover and may even eliminate it in some cases. With all harvest systems, the loss of hiding cover is not permanent. As vegetation becomes established on the harvested stand, hiding cover will once again become available. The time period varies by harvest system, but usually would not exceed 20 to 30 years for clearcut areas and less for intermediate harvested areas.

Long term elk habitat effectiveness considers a ten year period starting from the time sale activity would begin. Differences in alternatives are displayed using long-term potential elk use and percent change from presale condition.

EFFECTS COMMON TO ALL ALTERNATIVES

All action Alternatives, except Alternative I, would reduce long-term potential elk habitat effectiveness and increase forage on big game summer range. In all action alternatives, road management plans would be implemented to restrict motorized road use. Consequently, hunting opportunities based on access would be reduced.

Salvage sales, which may be planned to capture windthrown trees in and around harvest units, may require access behind a road closure. In this case, access roads would be gated during operations and barricaded after salvage operations are completed. No other harvest activities are planned in the Decision Area within the next ten years.

Other forseeable future actions within a 10 year analysis period include Pacific Gas Transmission Company's proposed pipeline, low scale mining activity, fuelwood gathering, and continued harvesting on private land. The nature of these activities is not expected to have any measurable adverse impact on big game summer range. Road closures would mitigate the effects of fuelwood gathering.

Possible Effects of Other Jurisdictions

Because deer and elk populations are effected by harvest levels, actions taken by Idaho Fish and Game on hunting regulations would directly influence elk populations using the Decision Area.

Consistency With the Forest Plan

Road closures would provide various levels of elk security. The Forest Plan Record of Decision states that most new local roads would be closed at some time during the Forest Plan period. The majority of big game summer range is in Management Area 1. Standards for MA 1 allow restrictions of road use to enhance wildlife habitat except as needed for timber management purposes (Forest Plan, p. III-3). Closure of new roads after sale activity is completed is consistent with Forest Plan standards.

No other Forest Plan standards apply to the Decision Area for elk summer range management.

ALTERNATIVE A

The No Action alternative would maintain potential long term elk habitat effectiveness at existing levels (56 percent). The existing roadless area and associated security values would be maintained.

ALTERNATIVE B2

Alternative B2 would reduce potential elk habitat effectiveness to 49 percent, a 13 percent change from the pre-sale condition. Extensive roading causes the high degree of impact under this alternative.

ALTERNATIVE D

Alternative D would reduce habitat effectiveness to 51 percent which is a nine percent change from presale conditions. Habitat effectiveness is maintained above 50 percent.

ALTERNATIVE E

Alternative E would reduce habitat effectiveness to 52 percent, a 7 percent change from presale conditions. Habitat effectiveness is maintained above 50 percent. The decline is caused by the loss of cover along existing roads. The habitat security value is aided by the fact there is no new road construction.

ALTERNATIVE EH

Alternative EH would reduce elk habitat effectiveness to 48 percent, a 15 percent change from presale conditions. The decline in long term potential habitat effectiveness is due to the degree of disturbance associated with the helicopter yarding.

This alternative would result in a reduction in elk habitat effectiveness to 37 percent during the year of helicopter operation due to the amount and area of disturbance associated with the helicopter operations. However, helicopter yarding would eliminate the need for roaded access. The elk habitat effectiveness following completion of sale activities would be 51 percent. In the long term (greater than 10 years) this action would result in less impact to elk, and other animals which need security habitat, than a roaded option.

ALTERNATIVE H

Alternative H would reduce elk habitat effectiveness to 50 percent. This value is a 10 percent change from presale conditions. Extensive roading in the roadless area would result in the loss of elk security values associated with it.

ALTERNATIVE I

Alternative I would increase habitat effectiveness to 59 percent. The elk habitat effectiveness would be 70 percent in subsequent decades, if no timber managment activities were to occur. Habitat effectiveness is maintained above 50 percent. Most of the existing roads would be closed to vehicular access and all new roads would be gated or barricaded, depending on their length.

ALTERNATIVE J1

Alternative J1 would reduce habitat effectiveness to 51 percent, a nine percent change from presale conditions. Habitat effectiveness is maintained above 50 percent. All new roads would be barricaded after completion of sale activities. The area west of Queen Mountain would be retained in a roadless condition to provide for a quality hunting experience and maintain forage areas under tree canopies.

ALTERNATIVE J2

Alternative J2 would reduce habitat effectiveness to 51 percent, a nine percent change from presale conditions. Habitat effectiveness is maintained above 50 percent. All new roads would be closed following post sale activities. The roadless area to the west of Queen Mountain would be lost due to roading.

ALTERNATIVE J2H

Alternative J2H would reduce elk habitat effectiveness to 46 percent, an 18 percent change from presale conditions. The difference in long term potential habitat effectiveness between alternatives J2 and J2H is due to the addition of the helicopter option.

This alternative would result in a reduction in elk habitat effectiveness to 30 percent during the year of helicopter operation due to the amount and area of disturbance associated with the helicopter operations. However, helicopter yarding would eliminate the need for some roaded access. The elk habitat effectiveness following completion

of sale activities would be 51 percent. In the long term (greater than 10 years) this action would result in less impact to elk, and other animals which need security habitat, than fully roading the area.

ALTERNATIVE K

Alternative K would reduce elk habitat effectiveness to 47 percent, a 16 percent change from presale conditions.

This alternative would result in a reduction in elk habitat effectiveness to 35 percent during the year of helicopter operation due to the amount and area of disturbance associated with the helicopter operations. However, helicopter yarding would eliminate the need for some roaded access. The elk habitat effectiveness following completion of sale activities would be 51 percent. In the long term (greater than 10 years) this action would result in less impact to elk, and other animals which need security habitat, than fully roading the area.

The following table indicates the change in effectiveness from the current conditions.

TABLE 4-7

ELK SUMMER RANGE CHANGE FROM EXISTING CONDITIONS BY ALTERNATIVE

	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Percent Change	0	-13	-9	-7	-15	-10	+5	-8	-9	-18	-16

Table 4-8

ELK HABITAT EFFECTIVENESS BY ALTERNATIVE

	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Potential (Following sale activity)	56	51	53	54	51	51	70	54	54	51	51
During Sale Activity	N/A	47	50	52	37	50	50	50	49	30	35
Long Term (10 year period)	56	49	51	52	48	50	59	51	51	46	47

WHITE-TAILED DEER
(*Odocoileus Virginianus*)

White-tailed deer is the designated indicator species for big game winter range. Cover/opening ratio and average size of openings are the habitat factors used to measure habitat effectiveness for white-tailed deer. Optimum thermal cover on winter ranges is 60 to 80 percent (Forest Plan, Appendix L). Jageman (1984) recommends cover/opening ratios from 60/40 in pachistima habitat types to 85/15 in Douglas-fir and ponderosa pine types. Calculations to determine the amount of openings created by alternatives considered the acreage of all harvest prescriptions that would eliminate the cover value of a stand. Cover/opening ratios are compared to the standards 60-80 percent cover component for cedar/hemlock habitat series and to not exceed a 10 acre regeneration unit size (Jageman, 1984).

Some alternatives emphasize the retention of cover and development of an 80:20 cover/opening ratio through a timber harvest rotation. These alternatives would imitate Owens (1981) findings that deer use was disproportionately higher in denser cover types and their home winter ranges averaged 21 percent openings. Cover would then also be maintained if timber harvest occurred on private lands in the valley bottom.

The effect of open secondary roads on white-tailed deer is largely unknown. Little information exists on the response of deer to traffic along roads. Reports have indicated that deer use roads in clearcuts as travel lanes, and that browsing 100 feet from the road was only 35 percent of the level occuring along the road. Likely, white-tailed deer distribution will be less adversely affected by traffic on roads than elk distributions. Deer have smaller home ranges and are thus less apt to show pronounced changes in distribution when roads are being used, especially when adjacent cover is dense (Jageman, 1984).

Heavy snowmobile traffic causes deer to move away from areas within 200 feet of snowmobile trails. Deer remain away from the trails for the duration of the disturbance but return less than 24 hours after the snowmobile use ceases (Jageman, 1984). Newly constructed roads within the winter range area would be closed with each alternative, reducing but not eliminating the chance for disturbance. The roads would be short deadend roads and would not provide loop trails for snowmobiling. These type of road systems do not provide the desirable characteristics for snowmobile trails and do not result in popular heavily used snowmobile trails. It can be anticipated that the majority of the snowmobile use would be limited to occasional local users and would not result in a large degree of disturbance to deer on this winter range.

Since deer seem to select habitats for cover value during the coldest winter months when snow is the deepest (over 18 inches), harvest systems that eliminate or reduce cover would have the greatest impact on deer winter range. Harvest systems that essentially eliminate any winter cover value and snow interception include all even aged regeneration harvest systems (clearcut, seedtree, and shelterwood). Most Intermediate harvest systems reduce crown closure below 70 percent and essentially eliminate the treated stands value as winter range cover. High mortality in lodgepole pine and white pine stands can also eliminate the winter range cover and snow interception value of a stand. Light sanitation/salvage harvesting that maintains canopy cover at 70 percent or higher would reduce but not eliminate a stands value as winter range cover.
The loss of cover is not permanent, as regeneration becomes established on the harvested stand, cover will once again become available. The time period varies by habitat type and site index, but usually would not exceed 22 to 26 years (Jageman, 1984) for the habitat types and site indexes present in West Moyie.

Uneven-aged management, both single tree selection and group selection, retain the most cover on a stand of any harvest prescription. With a group selection prescribed to harvest ten percent of a stand every ten years, 70 percent of a stand would remain in cover after the third entry. By the fourth entry the regeneration from the first entry should again provide cover. With this method 70 percent of the stand would provide cover at any time during the conversion period. To achieve the optimal cover/opening ratio of 80/20, it would be necessary to increase the

conversion period from 100 years to 110 or 130 years depending on the site index of each stand entered. Uneven aged management also favors species more tolerant to shade, such as western red cedar, grand fir, and Douglas-fir. Cedar is an excellent winter browse species and Douglas-fir is rated as a good browse species (Jageman, 1984).

The size of openings created in winter range areas is an important element in winter range management. Under milder winter conditions when deer movements are not restricted by deep snow, forage areas are probably more important than cover in determining habitat selection. Group selection, small clearcuts (less than 10 acres), or strip clearcuts (less than 200 feet wide) are the preferred methods of harvest (Jageman, 1984). These harvesting techniques provide for increased browse production and maintain adequate cover adjacent to browse areas to enable the deer to utilize the browse.

The analysis area would encompass 3,337 acres of primary winter range. Winter range for white-tailed deer occurs below approximately 3,000 feet and includes a significant area of Management Area 1 and some land in Management Area 9. See the deer winter range and MA map on the next page.

EFFECTS COMMON TO ALL ALTERNATIVES

All alternatives would reduce the amount of cover available to wintering deer. Cover would be lost due to timber harvesting and pine mortality with the action alternatives. With the no action alternative, cover would be lost in the lodgepole pine stands if the mountain pine beetle epidemic occurs as predicted. Cover loss similar to that of a sanitation salvage harvest could be expected in the mixed conifer stands due to mortality in the white pine component. Browse production would increase in openings but would not be available to deer during periods of heavy snow accumulation.

All action alternatives would minimize human activity through access management. This reduction in human activity would reduce disturbance and energy expenditures of wintering deer. Increased access due to new road construction may increase legal and illegal harvest of deer.

Effects of Other Jurisdictions

Because deer populations are effected by harvest levels, actions taken by Idaho Fish and Game on hunting regulations would directly influence deer populations using the Decision Area.

Reasonably Forseeable Future Activities

Winter range in the Moyie River valley would also be impacted by activities from the proposed East Moyie Timber Sale. Winter range would be considered during the planning and implementation of this sale.

Salvage sales may be planned in and around harvest units to capture possible windthrown trees. In the event that salvage sales are necessary, access roads would be gated during operations and barricaded after salvage operations are completed.

Other forseeable future actions with a 10 year analysis period include Pacific Gas Transmission Company's proposed pipeline, low scale mining activity, fuelwood gathering, and continued harvesting on adjacent private lands. The proposed pipeline would be a disturbance factor for short duration. Timber harvesting on private land would influence the winter range needs on National Forest lands. Other activities, such as fuelwood gathering, would be mitigated through the road closure plan and are not expected to have any measurable adverse impacts on winter range values.

ALTERNATIVE A (No Action)

The existing cover/opening ratio is 79/21. Cover would be slightly reduced over a 10 year period due to mortality of lodgepole and white pine. The reduction of forested canopy caused by this die-off would be minimal. Mixed conifer stands would provide mountain lover and cedar for browse. Natural openings would enlarge in lodgepole stands and promote cedar regenera-

tion which would provide forage. Openings are maintained at a level close to the 21 percent Owens (1981) found for average opening percentage for deer winter range.

Cover adequate to compensate for timber harvesting on adjacent private lands would be maintained by this alternative.

Consistency With the Forest Plan

This No Action alternative maintains cover at adequate levels to provide snow interception for wintering deer.

ALTERNATIVE B2

Alternative B2 would reduce cover/opening ratio to 55/45. This would be the largest reduction of any alternative. The average opening size is 27 acres. This alternative does not meet Jageman's recommendations for cover/opening ratio or unit size. This alternative would not designate a specific cover/opening ratio to be maintained throughout a rotation.

Cover would be removed through clearcut and seed tree harvests around Sinclair Lake and the meadow to the west of the lake. This area would be unavailable to deer during times of heavy snow. Seed tree units 41 and 42 would remove cover along Round Prairie Creek also. Extensive regeneration harvests on the first bench above the valley would provide only narrow stringers of cover between units. These units would impact some areas that supply good snow interception located around the edges of openings caused by lodgepole mortality.

Less cover would remain to compensate for possible timber harvesting on adjacent private lands.

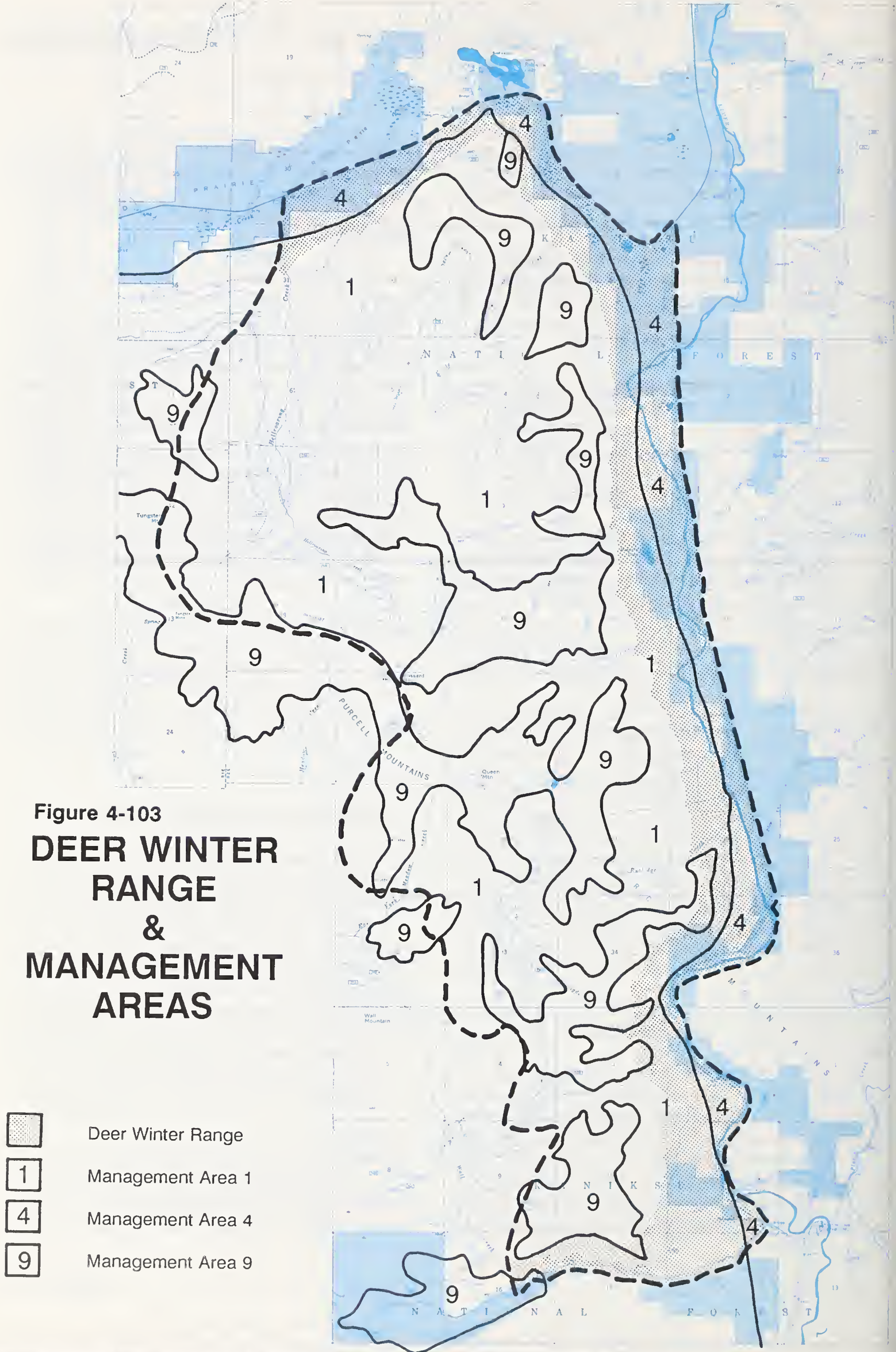


Figure 4-103
DEER WINTER RANGE & MANAGEMENT AREAS

Consistency With the Forest Plan

Currently, the majority of winter range is designated as MA 1. Timber production is emphasized in this management area. Therefore, planning larger regeneration units than those recommended for white-tail winter range is consistent with current management area designation.

The selection of seed tree harvest units in MA 4 would remove needed thermal cover from a quality white-tailed deer wintering area. Forest Plan standards for MA 4 indicate that needed thermal cover areas should be maintained (Forest Plan, pp. III-28). Removal of thermal cover from the quality white-tailed deer wintering area around Sinclair Lake is inconsistent with Forest Plan standards.

ALTERNATIVE D

The cover/opening ratio would be reduced to 65/35 from an existing 79/21 ratio. The average regeneration unit size is 21 acres. This alternative falls within management guidelines for cover/opening ratio but not for unit size.

Salvage units 33 and 37 would maintain existing cover in quality winter range. Unit 111 with 190 acres of uneven management would maintain some cover on the site, but may be too large to be effectively utilized by deer during heavy snow years. The basal area thin in unit 110 would also reduce canopy cover on 100 acres. Shelterwood units 34, 35, 36, and 113 would capture lodgepole mortality in an area that is currently providing limited snow interception and receives limited deer use during times of heavy snow accumulation.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest lands.

Consistency With the Forest Plan

Salvage harvest in the valley bottom would maintain cover in quality white-tailed deer wintering area, while capturing mortality. This is consistent with winter range designation.

ALTERNATIVE E

The cover/opening ratio is 65/35 and average cutting unit size is 20 acres. This alternative falls within the recommended guidelines for cover/opening ratio but not for unit size. This alternative would not designate a specific cover/opening ratio to maintain throughout a rotation.

Shelterwood harvesting would remove cover in stands with high winter deer use around Sinclair Lake and associated meadow. These areas would not be available for deer use during times of heavy snow accumulation.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest lands. Although the area around Sinclair Lake would be impacted, large areas of National Forest land would still provide cover.

Consistency With the Forest Plan

The selection of shelterwood harvest for units in Management Area 4 would remove needed thermal cover from a quality white-tailed deer wintering area. Forest Plan standards for MA 4 indicate that needed thermal cover areas should be maintained (Forest Plan, pp. III-28). Removal of thermal cover from the quality white-tailed deer wintering area around Sinclair Lake is inconsistent with Forest Plan standards.

ALTERNATIVE EH

The cover/opening ratio would be 60/40 and the average unit size is 21 acres. This alternative meets Jageman's recommendations for cover/opening ratio but not for unit size.

Uneven-aged management in units 1, 33, and 37 would leave groups of trees which would provide patches of cover interspersed with openings. No units would be broadcast burned to stimulate shrub production because of the presence of regeneration and the thin duff layer in the area resulting from the fire history in the

valley. However, regeneration of cedar would provide some browse.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest. Cover would be significantly reduced by this alternative.

Consistency With the Forest Plan

Uneven-aged management would retain cover on MA 4 ground and is consistent with Forest Plan standards to maintain needed thermal cover areas (Forest Plan, p. III-18).

ALTERNATIVE H

The cover/opening ratio would be 62/38 and the average unit size is 20 acres. This alternative meets Jageman's recommendations for cover/opening ratio but not for unit size. This alternative would not designate a specific cover/opening ratio to maintain throughout a rotation.

Uneven-aged management in units 1, 33, 37, and 68 would leave groups of trees which would provide patches of cover interspersed with openings. Seed tree units 41 and 42 would remove a significant amount of canopy around Round Prairie Creek. Seed tree units 34-36 meet winter range guidelines and capture lodgepole mortality. The average regeneration unit size is 20.6 acres. No units would be broadcast burned to stimulate shrub production because of the presence of regeneration. However, regeneration of cedar would provide some browse.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest. Cover would be significantly reduced by this alternative.

Consistency With the Forest Plan

Uneven-aged management would retain cover on MA 4 ground and is consistent with Forest Plan standards to maintain needed thermal cover areas (Forest Plan, p. III-18).

ALTERNATIVE I

Alternative I proposes to reach a cover/opening ratio of 80/20 over a complete rotation of the area. The cover/opening ratio would be 69/31 for the initial entry, and build to 80/20 through a rotation. Retention of cover would provide areas of snow interception, if harvesting of private ground occurs.

This alternative also proposes a management area change. Suitable winter range exists on MA 1 and MA 9 ground. This alternative would change approximately 2,800 acres of MA 1 and MA 9 to MA 4 because of winter range suitability.

Uneven-aged units 33 and 37 would retain pockets of snow-intercepting cover in an area of heavy winter deer use. The five-acre seed tree units scattered throughout the winter range would provide small patches of forage. These units would not be under-burned because of the difficulty in burning small units. However, cedar regeneration would be encouraged and browse species would be planted where possible.

The average regeneration unit size is five acres. This alternative meets Jageman's recommendations for cover/opening ratio and for unit size. Openings would be developed through a rotation to a level close to what Owens (1981) found for the average opening percent of deer winter home ranges.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest ground along the toeslope of Queen Mountain. This alternative would provide a significant amount of cover if harvest on private lands would occur.

Consistency With the Forest Plan

This alternative proposes a management area change of approximately 2,800 acres of MA 1 and MA 9 land to MA 4. The Forest Plan states that "Management Area boundaries are flexible to assure that the boundaries identified are protected and to incorporate additional information gained from further on-the-ground reconnais-

sance and project level planning" (Forest Plan, pp. III-1).

Appendix 27 (Management Indicator species) of the Forest Plan states that monitoring (deer habitat) should emphasize refined mapping of winter ranges based on snow depth and deer distribution. A field analysis of the area has shown that deer utilize the area up 3,000 feet. Although they concentrate on the valley floor during periods of heavy snow, beds and foraging were noted close to the 3,000 foot elevation.

ALTERNATIVE J1

Management would develop an 80/20 cover/opening ratio over a rotation. Uneven-aged management is proposed for units in areas of deer concentration. Shelterwood units would be limited to 15 acres. This attempts to minimize regeneration unit size while capturing lodgepole mortality. Shelterwood units in mixed conifer stands would be under-burned if possible to provide browse. Cedar regeneration would be emphasized in units with existing regeneration. Forty-acre overstory removal units 1 and 1A would remove additional cover from an area providing limited snow interception. These areas would provide future 40-acre thermal cover patches.

The cover/opening ratio would be reduced to 65/35 and the average regeneration unit size is 19 acres. This alternative meets Jageman's recommendations for cover/opening ratio but not for unit size. Openings would be maintained close to the 21 percent level that Owens (1981) found for average opening percentage of deer winter home ranges through a rotation.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest. This alternative would maintain a significant amount of cover if harvest on private land occurs.

Consistency With the Forest Plan

Uneven-aged management on MA4 land would maintain areas of snow interception and is consistent with Forest plan direction on winter range. Maintenance of an 80/20 cover-opening ratio on MA1 land below 3,000 feet is a "transition from one set of opportunities and constraints to another with management direction established for each" (Forest Plan, pp. III-1). In this case the area represents a transition from winter range to timber emphasis. This is consistent with Forest Plan Direction.

ALTERNATIVE J2

The cover/opening ratio would be reduced to 62/38 and the average regeneration unit size is 21 acres. There would be no direction to maintain a specified winter range cover/opening ratio. This alternative falls within the recommended guidelined for cover/opening ratio but not for unit size.

Uneven-aged management would be proposed for units in areas of deer concentration. Shelterwood units would be limited to 20 acres which attempts to minimize regeneration unit size and while capturing lodgepole mortality. These units would impact some areas that supply good snow interception located around the edges of openings caused by lodgepole mortality. Shelterwood units in mixed conifer stands would be under-burned if possible to provide browse. Cedar would be emphasized in units with existing regeneration. More emphasis is placed on silvicultural needs than in J1. Forty-acre overstory removal units 1 and 1A would remove additional cover from an area providing limited snow interception. These areas would provide future 40-acre thermal cover patches.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest. This alternative would maintain less cover than J1, if harvest on private lands would occur.

Consistency With the Forest Plan

Uneven-aged management on MA4 land would maintain areas of snow interception and is consistent with Forest plan direction on winter range. Larger (20 acre) cutting units than J1 on MA1 land below 3,000 feet is another example

of a "transition from one set of opportunities and constraints to another with management direction established for each" (Forest Plan, pp. III-1). In this case the area represents a transition from winter range to timber management with more emphasis on treating high risk stands. This is consistent with Forest Plan Direction.

ALTERNATIVE J2H

The cover/opening ratio would be reduced to 56/44 and the average regeneration unit size is 23 acres. There would be no direction to maintain a specified winter range cover/opening ratio. This alternative does not meet management guidelines for cover/opening ratio or unit size.

Uneven-aged management would be proposed for units in areas of deer concentration. Shelter-wood units would be limited to 20 acres which attempts to minimize regeneration unit size, while capturing lodgepole mortality. These units would impact some areas that supply good snow interception located around the edges of openings caused by lodgepole mortality. Shelter-wood units in mixed conifer stands would be under-burned if possible to provide browse. Cedar regeneration would be emphasized in units with existing regeneration. Forty-acre overstory removal units 1 and 1A would remove additional cover from an area providing limited snow interception. These areas would provide future 40-acre thermal cover patches. Helicopter salvage operations would significantly reduce the ability of the stands involved to provide snow interception. More emphasis is placed on silvicultural needs than in J1.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest ground along the toeslope of Queen Mountain. This alternative would maintain less cover than J1, if harvest on private lands would occur.

Consistency With the Forest Plan

Uneven-aged management on MA4 land would maintain areas of snow interception and is consistent with Forest plan direction on winter range. Larger (20 acre) cutting units than J1 on MA1 land below 3,000 feet is another example of a "transition from one set of opportunities and constraints to another with management direction established for each" (Forest Plan, pp. III-1). In this case the area represents a transition from winter range to timber management with more emphasis on treating high risk stands than either J1 or J2. This is consistent with Forest Plan Direction.

ALTERNATIVE K

The cover/opening ratio would be reduced to 65/35 and the average regeneration unit size is 17 acres. This alternative meets the management guidelines for cover/opening ratio but not for unit size.

Uneven-aged management would be proposed for units in areas of deer concentration. Shelter-wood units would be limited to 15 acres which attempts to minimize regeneration unit size, while capturing lodgepole pine and white pine mortality. These units would impact some areas that supply good snow interception located around the edges of openings caused by lodgepole mortality. Shelterwood units in mixed conifer stands would not be under-burned to increase browse production because of the existing regeneration and the thin duff layer resulting from the fire history in the valley. Cedar regeneration would be emphasized in units with existing regeneration.

Logging on private lands in winter range would reduce cover available to deer and emphasize the need for cover on National Forest ground along the toeslope of Queen Mountain. This alternative would maintain less cover than J1, if harvest on private lands would occur.

Consistency With the Forest Plan

Uneven-aged management on MA4 land, units 33 and 37, would maintain areas of snow interception and is consistent with Forest plan direction on winter range. Harvest units 22, 23, and 111 are group selection combined with

sanitation salvaging units in the MA1 lands under 3,000 feet. Units 25 and 26 are group selection units in MA1 lands under 3,000 feet. These harvesting methods would maintain cover in these mixed conifer stands. The shelterwood cutting units on MA1 land below 3,000 feet, average size of 17 acres, is an example of a "transition from one set of opportunities and constraints to another with management direction established for each" (Forest Plan, pp. III-1). In this case the area represents a transition from winter range to timber management with more emphasis on treating high risk stands. This is consistent with Forest Plan Direction.

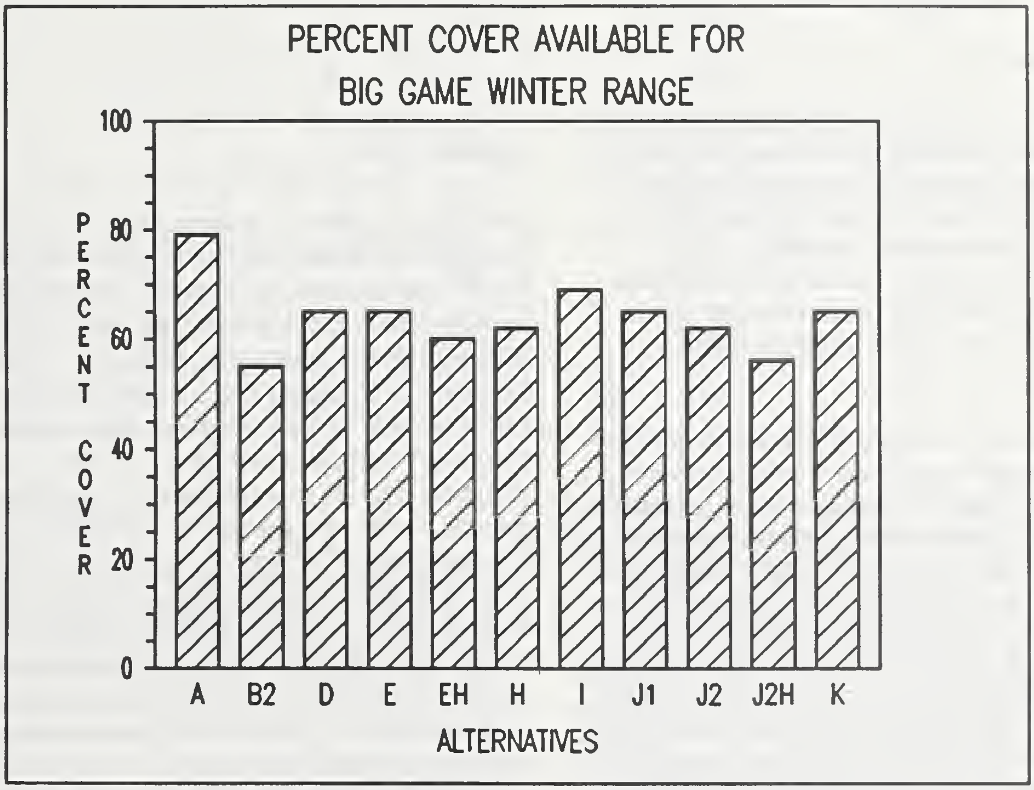


FIGURE 4-104 shows the current big game winter range conditions (Alt A) and the effects of the action alternatives. The IPNF Forest Plan recommends a range between 60 to 80 percent. Alternatives E, I, and J1 will develop additional cover over a timber harvest rotation period. This is shown by the solid portions of the bars.

Table 4-9 outlines the effects of the alternatives on the Average Cutting Unit Size in the respective management activities.

Table 4-9 **Average Winter Range Cutting Unit Size (Acres)**

B2	D	E	EH	H	I	J1	J2	J2H	K
28	21	20	21	21	5	19	21	23	17

INTRODUCTION

Various elements of the ecosystem and biodiversity are addressed first followed by the effects of the alternatives on these elements. The areas of old-growth and potential old-growth communities affected by the proposed alternatives are discussed. The alternative's effects on old-growth and fragmentation are compared.

THE ECOSYSTEM

Vegetative Diversity

Changes in the existing vegetative diversity would continue to occur through time in the West Moyie Area. The current mixture of trees would change as the stands of trees continue to age. The shade-tolerant tree species presently in the understory would become the dominant species, depending on human and natural events. Similar changes would occur in the other understory plant species.

The timber harvest proposed in the action alternatives would change the existing vegetative diversity. Older trees would be cut, and the stand replaced by young trees of the species now common in the West Moyie area. Stands would be planted with native tree species from seed obtained locally, and regenerated naturally from trees left on the site or from trees in neighboring stands. Similarily, seeding of shrubs, grasses, and other plant species would occur from neighboring stands or would be carried to the site by wind, birds, and other sources. Sprouting from roots of plants existing in the harvest unit also would occur. The genetic diversity of individual plants and tree species would be maintained by these natural events.

For instance, the hardwood trees now scattered through the Decision Area would gradually disappear because of their seral nature as forest succession continues and the existing stands become more climax. However in the action alternative's proposed harvest units, hardwood seedlings would regenerate because of the more open, sunny conditions and the removal of the more shade-tolerant coniferous trees. Hardwoods have regenerated in some of the existing even-aged harvest units in the West Moyie area.

Habitat Types

Habitat types exist as a permanent measure of the potential climax vegetation which occurs on a site as well as being an indicator of site potential. No alternative would change the habitat type. The different harvest treatments, however, would have the effect of changing the successional stage of a particular habitat type. Regeneration harvests including clearcuts, seed trees, shelterwoods, and group selections, as explained in the following section, would return a stand to an early successional stage. For all action alternatives, a majority of regeneration harvests would occur in the cedar, western hemlock, and subalpine habitat types. These habitat types are the most common in the West Moyie Decision Area. Correspondingly, the other harvest methods including basal area and commercial thinnings, sanitation-salvages, and uneven-aged management also would occur in these habitat types. For all action alternatives, therefore, vegetative diversity would be maintained by proportionally harvesting the habitat types represented in the Decision Area.

No harvesting would be done in habitat series with a limited representation in the Decision Area. For instance, the habitat series, western red cedar/devils club, occurs in only one stand in the Decision Area.

The acres of regeneration harvests in each habitat type by alternative are displayed in Table 4-10 on the next page.

Table 4-10

ACRES OF REGENERATION HARVESTS BY HABITAT TYPE

Alternative	Douglas-fir	Grand fir	Cedar	Western Hemlock	Subalpine fir	Total
B2	0	0	325	505	340	1170
D	0	0	0	105	0	105
E	0	0	95	45	25	165
EH	35	30	200	228	0	493
H	0	0	265	173	145	583
I	0	0	215	105	45	365
J1	35	0	185	198	42	460
J2	35	0	250	198	117	670
K	35	30	190	236	0	491

Forest Succession

For the No Action alternative as well as areas not included for harvest in any of the action alternatives, the existing mixed conifer stands consisting primarily of seral species would develop a multi-storied structure through time. This would happen as individual trees would die and be replaced by more shade-tolerant regeneration in the shaded openings. For unharvested lodgepole pine stands, the more shade-tolerant grand fir, subalpine fir, hemlock, or cedar would slowly increase in numbers; thereby causing a change in species composition. Successional development would continue toward a climax forest condition unless interrupted by a fire or other events. These types of disturbance promote the re-establishment of seral vegetation communities. A similar effect would occur to the understory vegetation.

All action alternatives would alter the existing succession stages. Even-aged harvest treatments would change the successional stage from mid or late-successional stages to an early successional stage. These acres of change are displayed in Table 4-16, Age-Class Distribution, for all the action alternatives. The vegetation in the even-aged systems--clearcut, seed-tree, and shelterwood--would include pioneer species such as fireweed and early-successional species adapted to open environments. The persistence of existing plant species and other biota would depend on site preparation and other management activities in addition to the species' adaptability to an open environment. The grasses, forbs, and shrubs in the understory would react to increases in light and available moisture caused by removal or partial removal of the overstory.

Many of the important big-game wildlife forage species - ceanothus, willow, maple, and serviceberry; depend on a moderate amount of direct sunlight to maintain their growth and vigor. Animals such as the deermouse and gophers, and birds such as bluebirds and flickers would increase populations. Later successional species such as the pine marten and mountain chickadee would have reduced habitat.

Seed-tree and shelterwood harvests would be multi-tiered for a few years after harvest because some trees would be left to provide shade or

seed. The general sequence of vegetation stages for these even-aged treatments would be:

Stage One:
Grasses, forbs, and conifer seedlings would dominate the disturbed site for one to 15 years following harvest. In units where site preparation occurred, vegetation would be temporarily reduced following treatment. Several species of grasses, forbs, and shrubs, however, would sprout from their root system the following spring. Grasses and forbs would become established on the site in one to three years; shrub sprouts and seedlings from one to eight years. Those species favoring increased sunlight would out-compete those species preferring shade. Conifer tree seedlings would be established either by planting or natural regeneration following site preparation.

Stage Two:
For the 15 to 40-year period following harvest, conifer saplings and shrub species would dominate the site. Grasses and forbs would still remain, but would be gradually out-competed by the taller trees and shrubs. Crown closure of the conifer canopy could occur late in this stage, but would be delayed if pre-commercial thinning were accomplished.

Stage Three:
Pole-size conifer trees generally would cover the site during the 40 to 80-year period following harvest. Crown closure would continue during this stage. Shade-intolerant grasses, forbs, and shrubs would continue to decline in population because of increased shade from the crown closure of the tree canopy. Conversely, shade-tolerant understory species would gradually increase.

Stage Four:
Mature conifer sawtimber would dominate the site within 80 to 110 years following harvest. Depending on tree species, total stand growth would peak sometime during this stage.

The intermediate harvest treatments--sanitation-salvage, basal area and commercial thinnings, and overstory removals--would have the effect of maintaining the existing succession stage of treated stands. For all action alternatives, the proposed sanitation-salvage harvests would remove 10 to 50 percent of the overstory canopy, allowing more sun to hit the ground. Stands would remain longer in a mid-successional stage because seral species would be retained longer. Understory plant and tree species as well as other organisms more adapted to an open environment would increase their growth and out-compete shade-tolerant plants which do not favor open conditions. For instance, species like huckleberry and grass species would increase. Ladyfern, Pacific yew, and other later-successional plants would be discouraged because of the increased sun. This effect would last 10 to 20 years until the tree canopy again becomes more closed as the existing trees grow and block out the sun (Oliver and Larson, 1990).

Those overstory trees not harvested would show an increase in growth because of reduced competition for sun, water, and nutrients. Stands would be more multi-canopied in structure than at present, favoring those animal and bird species which benefit from that structure. For all alternatives with sanitation-salvage cutting units in stands with pure lodgepole pine pockets larger than one acre, the lodgepole pine leave trees would be designated in a way to avoid creating larger openings.

Basal area and commercial thinnings would have a similar effect on stand succession as sanitation-salvage harvests. These treatments would remove 33 to 50 percent of the overstory canopy. These stand would be maintained in a mid-successional stage until a future regeneration harvest.

Overstory removal harvest would treat stands that currently are early-successional, and fully stocked with sapling-sized trees. No change would occur in succession stage.

Changes to Forest Succession

For all alternatives, changes to forest succession would continue to alter the ecosystem because of natural or human-caused events or climactic change. The preceding section discusses the changes to forest succession which would result by the harvest methods proposed in the various action alternatives. Future logging would also create changes in forest succession.

Wildfire would continue to cause changes in forest succession in the West Moyie Decision Area.

Most of these wildfires would be small lightning fires as have occurred over the past several decades, affecting only small areas. The probability of a large fire, as burned over the majority of the West Moyie area approximately 100 years ago, would be highest in the No Action Alternative. This would be due to the possibility of a mountain pine beetle epidemic which would kill a majority of the lodgepole pine. For all alternatives, a large wildfire would be possible during periods of extreme fire conditions.

Insect and disease attacks would continue to create small openings in the landscape, by killing individual trees or groups of trees. Examples include white pine blister rust affecting the white pine trees and root rots killing Douglas-fir and grand fir trees. These natural changes would occur in all alternatives.

Edge Effect

Edge effect would be created in all action alternatives by the development of new openings in the forest canopy. This edge effect would be a function of the number, size, and shape of even-aged harvest units (i.e. clearcut, seed tree, and shelterwood) and miles of road construction for the various action alternatives. The openings created by cutting all or a majority of the trees would allow more sun and wind to penetrate into the adjacent stand of trees. In turn this would increase the probability of blowdown of some trees and a change in vegetation and animal species.

For the No-Action Alternative, no increase in existing edge effect would occur from the existing situation shown on the map of Previously Harvested areas. (This map is included in the packet of Alternative Maps seperate from this document) Current edge effect conditions are discussed in Chapter 3 page 3-50.

A comparison of the increase in edge effect from the current situation is shown in Table 4-11 for all action alternatives.

The values in the following table represent an estimate of the relative acreage of edge effect among the various alternatives. Calculations assumed a uniform shape of regeneration harvest units and did not account for varying conditions on the edges of roads or units.

TABLE 4-11 A COMPARISON OF EDGE EFFECT

Management Effect	B2	D	E	EH	H	I	J1	J2	J2H	K
Total Acres Harvest	2290	1945	990	2669	1695	1105	1547	1767	2973	3093
Number of Harvest Units	62	29	19	51	45	40	44	52	66	63
Miles of New Road Construction	20.5	7.7	0	0	12.1	7.6	7.2	9.7	9.7	8.7
Acres of Edge Effect Created by New Roads	994	373	0	0	587	638	349	470	470	421
Total Acres of Regeneration Harvesting	1170	105	165	493	583	365	460	600	670	413
Number of Regeneration Harvest Units	40	4	6	20	25	27	21	27	29	18
Average Size Regeneration Harvest Units (acres)	29.0	26.3	27.5	24.7	23.3	13.5	21.9	22.2	23.1	22.9
Acres of Edge Effect Created by Regeneration Harvest Units	1653	157	241	762	925	760	753	975	1068	1250
TOTAL ACRES OF EDGE EFFECT	2647	530	241	762	1512	1128	1102	1445	1538	1671*

*** Includes the acres of Group-Selection Harvest**

Commercial and basal area thinnings, sanitation-salvage, and individual tree selection harvest methods were not included in the analysis of edge effect. These treatments would not cause a "hard" edge like regeneration harvest units. Because only a portion of the overstory trees would be removed in each of these harvest treatments, the increase of wind and sun into the neighboring stand would be substantially less. Reduced probability of tree blowdown would result along the boundary of the logged/unlogged areas of these harvest types in comparison with even-aged regeneration harvests. Because shade would be maintained, the vegetative change typical of edge effect would not occur; nor would a change of species of either plants, animals, soil organisms, or other biota.

The group-selection harvests prescribed in Alternative K, however, were included. As described in Appendix A, group-selection harvests would create openings averaging an acre in size. For the 777 acres of group-selection harvest in Alternative K, approximately 78 acres of openings would be created.

Old-growth

For all alternatives, those areas of existing and recruitment old-growth not included in a proposed harvest unit would continue to move toward a climax ecological condition. Seral species would continue to age and die, replaced by the shade-tolerant climax species in both the overstory and understory vegetation. Heart rot and other signs of tree decay would be characteristic of individual trees.

Alternatives B2, D, and H all would include harvests in existing old-growth. Fourteen acres of existing old-growth would be harvested in Unit 54 for each alternative; reducing the acreage of existing old-growth in Old-Growth Management Unit 30 from 768 to 754 acres, or 6.1 percent. Old-Growth Management Unit 30 still would exceed the five percent standard of existing old-growth specified in the IPNF Forest Plan. With the harvest of two acres of existing old-growth in Old Growth Management Unit 23, Alternative B2 would be in violation of Forest Plan old-growth standards since OGMU 23 currently is below the five percent level.

Though no harvest would occur, Alternatives I, J2, J2H, and K would fragment the existing old-growth stand located in Section 33 of the East Fork of Meadow Creek. For each of the alternatives, the road accessing Units 55, 56, and 56A would isolate nine acres of existing old-growth on the eastern edge of the stand. This fragmentation would reduce its value to old-growth associated species, and would decrease the size of this existing contiguous old-growth habitat.

Alternative B2 would be the only alternative to fragment recruitment old-growth by road construction. The road proposed to access Units 2 and 4 in this alternative would separate 25 acres from the recruitment acres identified in Section 10 in the southern portion of the Decision Area.

For all alternatives which harvest recruitment old-growth, replacement stands would be designated. These replacement stands, however, necessarily would not possess the same important qualities of the original acres in terms of relative location and stand attributes. In all alternatives, the combination of existing and recruitment old-growth would total ten percent in each Old Growth Management Unit.

The following table summarizes the amount of old-growth and potential old-growth recruitment stands which would be harvested.

TABLE 4-12

EFFECTS OF HARVEST ON EXISTING AND POTENTIAL OLD-GROWTH RECRUITMENT STANDS

Alternative	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Acres of Harvest in Existing Old-Growth	0	16	14	0	0	14	0	0	0	0	0
Acres of Harvest in Potential Old-Growth Recruitment	0	40	42	21	21	16	0	18	18	18	2

Fragmentation

Table 4-13 displays the effects of the various alternatives on fragmentation. The total acreage of interior forest and the total number of habitat patches for each alternative are shown. The existing situation is portrayed by Alternative A, in which there are seven blocks of land exceeding 80 acres which currently exist as suitable habitat for interior forest habitat species. (Figure 3-14 on page 3-56 shows the existing forested environment and additional information can be read in the Chapter 3, page 3-34. An 80-acre stand size is considered as approximately the minimum size for an effective interior forest habitat area (Doyle, 1990).

For the action alternatives, the effects of fragmentation are shown for these seven blocks. Multiple acreages result from one interior block being fragmented by such management activities as road construction or timber harvest. Maps of each alternative depicting the changes in interior forest habitat are located in the planning records.
For all action alternatives, the acreage of interior forest habitat would be reduced from the existing situation. Alternative E would have the lowest reduction, 900 acres, because this alternative would include no new road construction. The greatest reduction would occur in Alternatives J2H and K because of the their higher acreage of intermediate treatments.

Intermediate treatments (basal area and commercial thinnings and sanitation-salvages as well as uneven-aged timber harvests) however, would not have the same effects to interior forest species as even-aged regeneration harvests (clearcut, seed tree, and shelterwood). Intermediate and uneven-aged treatments would result in a temporary reduction in the effectiveness of these areas as habitat for interior forest species. Less vegetative disturbance in these treatments, however, would allow their faster recovery to an existing condition as the canopy of trees and the understory vegetation grow and skidtrails re-vegetate.

The least effect would occur in those units which would be helicopter-logged as no roads or skidtrails would be constructed. Moreover, these areas would still provide a set of habitat conditions which would allow most interior forest habitat species to use these areas as travel or migration corridors or feeding areas. For instance, pine marten would still travel through these areas in the winter because the existing snow-intercepting capabilities of the tree canopy would remain. On the other hand, marten would generally avoid clearcuts because of the deeper ground snow levels. The acreage of intermediate harvest and uneven-aged management are displayed for each alternative.

The following table shows the current interior forest habitat condition. Areas which contain more than one value in an alternative column show the effect of fragmentation caused by either timber harvest and/or road construction. For example, the difference between Area A as shown under Alternative B2 and Alternative D, is due to the additional fragmentation that would result from the activities of the action alternative.

Table 4-13 FRAGMENTATION AND INTERIOR FOREST ANALYSIS BY ALTERNATIVE

Acres of Interior Forest Habitat	A•	B2	D	E	EH	H	I	J1	J2	J2H	K
Area A	1129	193 88 538	1093	1093	1076	1005	1005	1005	1005	1005	1001
Area B	335	321	327	327	321	327	327	321	321	321	327
Area C	173	101	101	101	105	101	101	0	0	0	0
Area D	701	314	314	314	409	314	314	265 138	265 138	265 138	272 138
Area E	174	156	156	156	161	156	174	161	161	161	161
Area F *	10482	7648 376 37	6082 3033	10125	1777 119 3947 528 149 1576	8812 45	9414 223	9524 219	5696 208 109 2547	1777 208 109 3058 549 1576	1923 3438 188 302 104 1533 114
Area H	168	62	78	120	78	78	78	78	78	78	124
Total Acres of All Interior Forest Habitat	13162	9834	11224	12236	10246	10838	11636	11711	10499	9245	9477
Total Number of Fragments	7	11	8	7	12	8	8	9	11	13	14
Acres of Intermediate Harvest	0	985	1840	925	2027	1040	740	997	1052	2139	2636

•Alternative A is the existing condition of the West Moyle Decision Area.
*** Area G as originally outlined was too small for accurate analysis. It was combined with Area F.**

The total number of habitat patches (fragments) are also displayed for each alternative in Table 4-13. There would be no increase in number of blocks of interior forest in Alternative E, and the largest increase would be created in Alternatives EH, J2H, and K. Several of the fragments created in the latter three alternatives would result from salvage harvests. As discussed above, these areas would cause a temporary reduction in effectiveness for interior forest habitat species, but would not have the same degree of effect as even-aged harvest treatments.

The analysis of management indicator species is included in the wildlife sections of Chapters 3 and 4. The four species associated with old-growth interior forest habitat which are addressed are:

1. pine marten,
2. northern goshawk,
3. pileated woodpecker, and
4. boreal owl.

The effects of the alternatives on the population viability of pine marten, northern goshawk, and pileated woodpecker are based on habitat suitability indexes (HSI's). These HSI models measure the effectiveness of the habitats for each species dependent on their individual habitat requirements. Effects on boreal owl were analyzed by calculating the percentages of the area that would provide suitable habitats for nesting and feeding. These species represent several other interior forest habitat-dependent species and reflect the overall condition of interior forest habitat.

Comparison of Alternatives
Effects on the Old-Growth Resource and Fragmentation

Alternative A, the no action alternative, would not harvest any old-growth. Old-growth would be maintained at current levels.

The Decision Area currently contains 13,162 acres of interior forested habitat located in seven blocks Six major biological corridors have been identified (see map of existing interior forested habitat and cooridors, Chapter 3, page 3-56).

Alternative B2 would have the greatest impact on old-growth. Alternative B2 would propose 14 acres of harvest in the existing old-growth stand in Section 33 of the East Fork of Meadow Creek. Additionally, Alternative B2 would fragment 25 acres of recruitment old-growth by a road accessing Units 2 and 4.

Alternative B2 would reduce the effective interior forested habitat to 9,834 acres. The number of blocks of interior forested habitat would be increased from seven to 11, due to fragmentation from timber harvesting and road construction. One of the biological corridors would be substantially modified and three would be moderately modified. Two of the corridors would remain essentially unchanged.

Alternative D - fourteen acres of existing old-growth would be entered by this alternative in the East Fork of Meadow Creek, reducing the percentage of old-growth in OGMU 30 to 6.2 percent. Two areas of recruitment old-growth totalling 42 acres, located in McDougal and the East Fork of Meadow Creek, also would be entered. With these entries, the future option for these stands to become old-growth would be removed. After Alternative B2, Alternative D would have the second greatest effect on the old-growth resource.

Alternative D would reduce the effective interior forested habitat to 11,224 acres. The number of blocks of interior forested habitat would be increased from seven to eight. Two of the biological corridors would be moderately modified. The remaining four corridors would remain essentially unchanged.

Alternative E would harvest no acres of existing old-growth, but would salvage harvest 21 acres of recruitment old-growth located in Section 33 of McDougal Creek. The option for this area to become an old-growth area in the future would be removed.

Alternative E would reduce the effective interior forested habitat to 12,236 acres, the number of blocks of interior forested habitat would remain the same as there would be no new road construction with this alternative. One of the biological corridors would be moderately modified, the remaining corridors would remain essentially unchanged.

Alternative EH would be identical to Alternative E in effects to old-growth. Eighteen acres of recruitment old-growth would be harvested in Unit 106.

Alternative EH would reduce the effective interior forested habitat to 10,246 acres. The number of blocks of interior forested habitat would be increased from seven to 12, due to fragmentation from timber harvesting, much of which is sanitation salvage harvesting. One of the biological corridors would be substantially modified. The remaining corridors would remain essentially unchanged.

Alternative H - an estimated fourteen acres of existing old-growth in the East Fork of Meadow Creek in Section 33 would be harvested, causing a reduction in acreage to 6.2 percent in Old Growth Management Unit 30. The adjacent stand of recruitment old-growth also would be entered with 16 acres being harvested in Unit 54.

Alternative H would reduce the effective interior forested habitat to 10,838 acres. The number of blocks of interior forested habitat would be increased from seven to eight. Three of the biological corridors would be moderately modified, the remaining corridors would remain essentially unchanged.

Alternative I - no existing or recruitment old growth would be harvested in Alternative I. However, the road accessing Units 55, 56, and 56A would cause nine acres of existing old-growth to be fragmented from the remainder of the stand.

Alternative I would reduce the effective interior forested habitat to 11,636 acres. The number of blocks of interior forested habitat would be increased from seven to eight. One of the biological corridors would be substantially modified and one would be moderately modified. The remaining corridors would remain esentially unchanged.

Alternative J1 - As with the other J Alternatives and Alternative B2, 18 acres of recruitment old-growth would be harvested in Unit 3. No existing old-growth would be harvested in this alternative.

Alternative J1 would reduce the effective interior forested habitat to 11,711 acres. The number of blocks of interior forested habitat would be increased from seven to nine. Two of the biological corridors would be moderately modified. The remaining corridors would remain esentially unchanged.

Alternative J2 - No acres of existing old-growth would be harvested, but the road accessing Units 55, 56, and 56A would fragment 9 acres of existing old-growth in Section 33 of the East Fork of Meadow Creek. Eighteen acres of recruitment old-growth would be harvested in Unit 3 of this alternative.

Alternative J2 would reduce the effective interior forested habitat to 10,499 acres. The number of blocks of interior forested habitat would be increased from seven to 11, due to fragmentation from timber harvesting and road construction. One of the biological corridors would be substantially modified and two would be moderately modified. The remaining corridors would remain esentially unchanged.

Alternative J2H would have the same effects on old-growth as Alternative J2. No acres of existing old-growth would be harvested in Alternative J2H, but a road accessing Units 55, 56, and 56A would fragment 9 acres of existing old-growth in Section 33 of the East Fork of Meadow Creek. Eighteen acres of recruitment old-growth would be harvested in Unit 3 of this alternative.

Alternative J2H would reduce the effective interior forested habitat to 9,245 acres. The number of blocks of interior forested habitat would be increased from seven to 13, due to fragmentation from timber harvesting and road construction. One of the biological corridors would be substantially modified and two would be moderately modified. The remaining corridors would remain esentially unchanged.

Alternative K - no acres of existing old-growth would be harvested. However, the road accessing Unit 56 would isolate nine acres of existing old-growth in Section 33; this fragmentation would also occur in Alternatives I, J2, and J2H. Two acres of recruitment old-growth would be harvested in Unit 56.

Alternative K would reduce the effective interior forested habitat to 9,477 acres. The number of blocks of interior forested habitat would be increased from seven to 14, due to fragmentation from timber harvesting and road construction. One of the biological corridors would be substantially modified and two would be moderately modified. The remaining corridors would remain esentially unchanged.

BIOLOGICAL CORRIDORS

Linkages to forested areas outside the Decision Area were discussed in Chapter 3. (Figure 3-14 on page 3-56 shows the existing forested environment and biological corridors.) These linkages provide biological corridors for movement of interior plants and animals. The various combinations of harvest units and road locations would modify the existing forested corridors. Table 4-14 displays the relative effects of each alternative.

Additional information can be read in the Chapter 3, page 3-34. A more detailed analysis is located in the planning files. There are no standards in the IPNF Plan concerning maintenance of biological corridors.

The following table displays the existing situation (Alternative A) and the effect each alternative would have on the West Moyie Decision Area.

TABLE 4-14

Relative Values of Biological Corridor Effectiveness.

Alternative	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Biological Corridor:											
Brush Lake	0	□	0	0	0	□	0	□	□	□	□
Meadow Creek	0	□	□	0	0	□	□	0	□	□	□
Wall Creek	0	□	0	0	0	0	0	0	0	0	0
Dawson Ridge	0	0	0	0	0	0	0	0	0	0	0
Moyie River	0	■	□	□	■	□	■	□	■	■	■
Robinson Lake *	■	■	■	■	■	■	■	■	■	■	■
Number of Unmodified Corridors	5	1	3	4	4	2	2	3	2	2	2

0 - The corridor is maintained at existing levels or slightly modified.
□ - The corridor is moderately modified
■ - The corridor is substantially modified
* - The Robinson lake corridor is currently marginally effective.

The **Brush Lake** linkage includes three 1000-2000 foot corridors. Alternatives D, E, EH, and I would slightly modify the northenmost corridor; one harvest unit would be located in this area. Alternatives H, J1, J2, J2H, and K would result in more impact to this corridor with two harvest units and the associated road. The greatest impact would occur in Alternative B2 because of the more extensive road-building and regeneration harvests which would reduce the effectiveness of the two northern corridors. None of the above alternatives would affect the two southern corridors.

Alternatives A, E, EH, and J1 would maintain the existing mile-wide corridor to the **Meadow Creek** area. The other alternatives would reduce the width of the corridor by harvest units and road construction in the southern portion of the corridor. For all alternatives, the northern portion of the Meadow Creek corridor would not be impacted.

The **Wall Creek** linkage is an approximately one-half mile wide corridor. Alternative B2 would be the only action alternative which would modify this corridor. Two regeneration units and a proposed road would reduce the width of this corridor.

The **Dawson Ridge** area lies south of the Decision Area. The existing linkage is presently influenced by the Meadow Creek Road and a commercial thinning harvest. Alternatives B2, E, H, and K all

would include a unit (Unit 50) of either an intermediate or uneven-aged harvest. These harvest methods would reduce the existing canopy in the harvest unit, and therefore would influence the movement of some interior forest habitat species through the harvest unit until the area recovered.

All the action alternatives would modify the existing situation on the east side of the Decision Area. The Moyie River road, railroad, pipeline corridor, and land-clearing are existing barriers for some species of plants and animals across the **Moyie River valley**. All action alternatives include a harvest unit near Sinclair Lake (Unit 37), which decreases the effectiveness of the northernmost existing corridor on National Forest lands. For Unit 37, this treatment is either an intermediate or uneven-aged harvest except in Alteratives B2 and E which have regeneration harvests. These types of harvest systems would maintain a forested canopy which would permit the movement of some plants and animals.

Because of the high number of regeneration harvests and miles of road construction, Alternative B2 would have the largest impact among the alternatives. Alternatives EH, J2, J2H, and K also include more regeneration harvests in this area than the other alternatives. Alternatives EH and J2H additionally would include large acreages of helicopter intermediate treatments on this portion of the Decision Area. Alternatives D, E, H, I, and J1 also would include harvest units and road construction in this area, but would retain ample corridors which access private and federal lands. For all alternatives, buffer strips would be maintained along riparian areas; important areas for plant and animal movements.

For all alternatives, the **Robinson Lake** corridor would be minimally effective as a biological corridor because of U.S. Highway 95 and existing harvest units. The Robinson Cruiseo Timber Sale, outside the Decision Area and north of Highway 95, includes intermediate harvests which will remove trees from the existing shelterwood units left by previous ice-storm salvage harvest. Several of the action alternatives (Alternatives B2, D, E, EH, H, and I) would include a harvest unit just south of the highway (Unit 68). Because this corridor is already severely impacted, the effect of this additional unit would be minimal to the Robinson Lake corridor.

Nine patches of **existing old-growth and recruitment old-growth stands** are located in the Decision Area. These old-growth areas currently are connected by stands in a mid-successional stage, which restricts the movement or migration of some old-growth associated biota. As these stands move toward late-successional stages, they would provide more effective biological corridors among the old-growth areas than presently. The biological corridor effects discussed above would also affect the interconnectivity of existing old-growth areas with other old-growth lying outside the Decision Area.

Riparian Areas

For all alternatives, buffer strips would be the primary means used to protect riparian areas along **permanent and intermittent mountain streams** within the Decision Area. The width of this protective strip would vary from 50 feet to several hundred depending on topography. Because no harvest would occur within these buffers, riparian vegetation would be protected. In addition, stream channel stability would be maintained and the potential of sedimentation would be reduced. Studies have proven that stream buffers would mitigate the effects of logging on the diversity and populations of invertebrates (Newbold, et.al., 1980) and other biota. For those buffer strips bordering even-aged harvest units, some edge effect would occur. Little edge effect would occur on those buffer strips bordering the other harvest methods.

Portions of units proposed in each action alternative would harvest riparian areas. These harvests largely would occur in intermittent streams. Although commercial and basal area thinning, sanitation-salvage, and uneven-aged management treatments also would be proposed in the riparian areas of some permanent streams.

The different harvest methods would have varying effects on riparian biota. Except for those trees left to provide shade to the streamcourse, the majority of trees would be removed in a clearcut. The increased sunlight into the riparian corridor would potentially alter the riparian ecosystem, causing changes in vegetation and riparian fauna.

Similar effects would occur in seed tree and shelterwood harvests though more overstory would be left through the harvest unit and adjacent to the riparian area. Because of the reduced overstory, the effectiveness of these riparian areas as biological corridors would be reduced for some species. The higher probability of blowdown of reserve trees in these even-aged harvest systems also reduces the effectiveness.

The length in linear feet of the riparian areas by harvest method are displayed below.

Table 4-15.

LINEAR FEET OF RIPARIAN HARVESTS

Altern.	Clearcut	Seed Tree	Shelter-wood	San-Salv	Thinning	Uneven	Crossings of Intermittent & Permanent Streams *
A	0	0	0	0	0	0	0
B2	2450	2600	0	3600	2200	0	17
D	0	0	1800	15,000	5600	10,600	14
E	0	0	0	4600	1500	0	0
EH	0	0	2000	44,600	7400	800	0
H	800	400	1300	7600	1300	2400	13
I	0	0	0	6800	1700	800	9
J1	0	0	0	6400	0	800	10
J2	800	0	0	11,200	0	800	12
J2H	800	0	2000	44,600	7400	800	11
K	0	0	2000	34,400	7400	800	13

* Stream crossings would be created by road construction. The majority would occur on intermittent unnamed creeks.

Sanitation-salvage, commercial and basal area thinnings, and uneven-aged harvests would have the least effect on riparian areas because both understory vegetation and an overstory of trees would be maintained. This would provide shade and less disturbance to riparian plants and animals. Biological corridors also would be maintained. To mitigate the effects of harvesting riparian areas and to ensure the protection of riparian biota, State of Idaho Best Management Practices covering streamside protection zones and stream shading requirements would be followed.

The number of stream crossings, which would be created by road construction, also are displayed for the various alternatives in Table 4-15. Alternatives E and EH would construct no new roads and therefore would not require any stream crossings. For the other alternatives, a majority of these stream crossings would occur on unnamed intermittent creeks. With the exception of Alternatives A, E, and EH, the other action alternatives would include two stream crossings on the lower portion of Bussard Creek. Additionally, Alternatives B2 and H would include a stream crossing on Little Hellroaring Creek. For all alternatives, metal culverts would be used at these stream crossings.

Culverts and roads potentially would create a barrier for movement or migration of some invertebrates such as certain aquatic insects, some amphibian species, and riparian vegetation. An indirect effect of installing culverts would be the introduction of sediments into the streamcourse. Sediments affect the diversity and population of riparian fauna.

The effects of culverts would vary by the class of stream. Less potential effect would occur in intermittent streams than in permanent streams

because of the seasonal lack of water and smaller riparian area. To mitigate the potential effects of sedimentation, Best Management Practices and timber sale contractual clauses covering erosion prevention and control would be followed during culvert installation and the life of the timber sale. Stream crossings would be designed following "Rules and Regulations and Minimum Standards for Stream Channel Alteration" as adopted by the Idaho State Board of Water Resources.

All of the action alternatives would include harvest units which extend into the flat **lowlands of the Moyle River and**, except Alternatives J1, J2, J2H and K, they would have harvest units in **the lowlands of Round Prairie Creek**. However, no alternative would include the riparian plant communities identified in Chapter 3 or would affect other riparian vegetation.

For all alternatives, no effect would occur to the **lakes** in the Decision Area--Queen, Bussard, and Sinclair--because no management activities are proposed in the immediate vicinity of these three water bodies.

Two alternatives potentially would affect the **sphagnum bog** located in the northern tip of the Decision Area. It lays south of Highway 95, near Round Prairie Creek. Both Alternatives B2 and H would include a seedtree harvest treatment (Unit 42) immediately adjacent to this small wetland. The harvest treatment would alter the timing and amount of water flowing through the bog. These seasonal variations would result in a larger, earlier flow in the spring because of an earlier snowmelt and drier conditions during the summer months. The composition of plant species and other biota potentially would be changed (Manci, 1989).

Special or Unique Environments

None of the alternatives would affect the **scree slopes**, **avalanche chutes**, and **Sitka alder thickets**. Various action alternatives, however, would affect the other unique environments identified in Chapter 3 (figure 3-15 on page 3-60). These effects are discussed below.

Several action alternatives include **graminoid parklands** within proposed unit boundaries. Numerous graminoid parklands are distributed throughout the Decision Area, and range in size from hundreds of acres to small microsites as illustrated on page 3-60, Special and Unique Environments Map. Only Alternatives A and E would not involve any of these special environments. The graminoid parklands proposed in the other action alternatives are small areas, generally less than 1/2-acre, surrounded by a forested stand. The alternatives would vary in the number of parklands affected from one in Alternative J2 to ten in Alternative J2H.

A majority of the harvest prescriptions in the units around the graminoid parklands are salvage and thinning removals. They would have little effect as these parklands would naturally be avoided because of their lack of trees and the rocky nature of these sites. The even-aged silviculture systems possibly would have more effect because of site preparation activities and more intensive skidding. But the impact would be limited to the margins, as the rocky ground would discourage skidding operations through the parkland. The greatest potential impact would be the indirect effect of the introduction of noxious weeds, which would replace the existing plant community.

The alternatives would not affect a majority of the identified **hardwood stands**. However, a 5-acre black cottonwood stand would be included within an even-aged harvest unit (Unit 20) in Alternatives B2, H, and I. The overstory cottonwood trees would be felled, and the interspersed coniferous trees left as leave trees to regenerate the stand.

The **"deer yarding areas"** in the lowlands along the Moyie River are an important wintering range for white-tailed deer and moose. Harvest units 33 and 37, which are proposed in several action alternatives, would affect these areas. For those alternatives, some damage would occur to the western red cedar understory during felling and skidding operations. No effect would occur in both Alternatives A and H, because no harvest is proposed in these units. The stands would be maintained in both these alternatives as high-quality winter range, with a good interspersion of cover and feeding habitats.

The even-aged harvests proposed in Alternatives B2 and E would remove a majority of the snow-intercepting overstory trees in these wintering areas. To provide a seed source for natural

regeneration, approximately 15 to 20 overstory trees (mainly larch, ponderosa pine, and Douglas-fir) would remain in each acre in the seed tree prescription of Alternative B2. Thirty to forty trees would remain in each acre in the shelterwood prescription of Alternative E. For both alternatives, a majority of these reserve trees would be cut following the successful regeneration of the unit.

Because the reserve seed trees would be seral species, the composition of the understory would change from predominantly the important forage specie of western red cedar to largely larch, ponderosa pine, and Douglas-fir. When exposed to the increased sunlight caused by these even-aged treatments, the western red cedar saplings possibly would be damaged or killed by the inability of the foliage to adapt or change to the new light conditions. The foliage of these trees is adapted to a shaded environment because of the existing overstory (Graham, 1982).

Alternatives EH, I, J1, J2, J2H, and K all would employ an uneven-aged single-tree selection silvicultural system for Units 33 and 37. This harvest method would remove 10 to 20 percent of the overstory every 10 years, or 20 to 30 percent of the volume every 20 years. Because individual trees would be removed, a protective snow-intercepting overstory would be maintained in the units over time in comparison with the even-aged regeneration treatments.

The units would become more a multi-canopied stand than the present two-storied structure because of the regeneration established following each cutting cycle. A multi-canoped structure would reduce the wind speed through the stand, and provide increased security habitat. Regeneration would be more mixed than the even-aged treatments proposed in Alternatives B2 and E, and would include shade-tolerant species such as western red cedar.

A salvage harvest would occur in these units in Alternative D. The effect of this harvest method would be similar to the uneven-aged treatment discussed above. The overstory would be maintained because only scattered lodgepole pine and white pine would be removed. Some regeneration of largely shade-tolerant species would occur following harvest, but regeneration would be minor because of the low level of overstory harvest.

Threatened, Endangered, & Sensitive (TES) Plants

As discussed in the Affected Environment Section, all plant species of concern known to exist in the Decision Area are located near wetlands. No harvest units or management activities are proposed in any area where surveys have identified the occurrence of sensitive plant species. The action alternatives are not located near any wetland, with the exception of Alternatives B2 and H. The effect of these alternatives on a small bog are discussed above in the Riparian Areas section.

If a TES species is discovered during operations, the plant and its habitat would be protected. All alternatives would meet direction of Forest Service Manual (FSM) 2670 and would comply with the Endangered Species Act of 1973. Contract Clause C6.25 - Protection of Habitat of Endangered Species (6/78) would be included in all timber sale contracts for any of the action alternatives.

Management Indicator Species

The effects to Management Indicator Species is displayed in the Wildlife Section of this chapter. The effects to Management Indicator Species reflect corresponding changes to other wildlife species in addition to their associated environments.

Large standing and down woody material

A discussion on the effects of the various action alternatives on Cavity and Snag-Using Species is included in Appendix D. The Snag and Down Woody Timber Guidelines of the IPNF Forest Plan would mitigate the effects to species dependent on large woody material.

Another important function of dead and down trees involves recruitment of large woody material into streams. For all alternatives, the majority of streams would be buffered by a leave strip of trees on both sides of the stream extending fifty to several hundred feet from the stream channel. The trees in these buffer strips would provide the needed recruitment of down woody material as trees die and fall into the streams. In those units in which riparian areas would be harvested, the

guidelines specified in the Snag and Down Woody Timber also would be followed to ensure adequate recruitment.

Soils

The direct effects to soils are discussed later in Chapter 4. These direct effects to the soil also would alter the habitat of soil organisms. The type of logging systems and the burning of harvest residues would affect soil organisms by removing large woody debris upon which several species depend or by moving or compacting the soil. The permanent loss of land to roads also would cause a corresponding loss of habitat for soil biota. Skid trails and landings also would decrease existing and future populations of soil organisms because of the displacement and loss of the organic layer and compaction of the goil on these acres. Roads, skidtrails, and landings also would inhibit the movement of some soil organisms by creating a barrier.

Plants produced by air-borne seeds would not be affected to the degree that sprouting plants would be. Similarily, sub-surface fauna such as earthworms and mites would be restricted by these barriers more than above-surface soil animals such as spiders, reptiles, and amphibians.

Partial or complete removal of trees and forest residues alters the forest environment, and therefore indirectly influences the forest soil fauna and flora. Loss of trees changes temperature, moisture, light intensity, wind, and humidity in the area. Clearcutting would have the greatest impact of the harvest methods proposed in the West Moyie. However, all harvest treatments would disrupt both the daily and seasonal changes in these physical factors of the microclimate.

The effect would depend on the amount of disturbance and amount of trees and other vegetation which would be removed. The intermediate treatments including thinning and sanitation-salvage harvests and uneven-aged harvests would have less effect than the even-aged treatments of clearcut, seed tree, and shelterwood. Some soil fauna and flora, unable to tolerate the new microclimate, would be at a disadvantage and disappear. Other groups not only would survive the environmental change but would increase as a result of the harvest treatment (Fellin, 1979).

Harvest's effect on the forest soil biota would diminish as the treated area would begin to regenerate with trees and broad-leaved vegetation. The new vegetation and the litter produced by it may differ from that of the previous forest, and an entirely new group of forest floor fauna may become established. As the new forest develops, forest floor biota would progressively "return to normal". However, several years would pass before the forest floor biota would return to what presently exists in numbers and species. The return to a normal association would depend on the relationship of the harvested area to the undisturbed forest, from which species can migrate and colonize (Fellin, 1979).

As discussed in the Soils portion of this chapter, the use of Best Management Practices as outlined in the Soil and Conservation Practices Handbook and Rules and Regulation Pertaining to the Idaho Forest Practices Act would mitigate the effects of the various action alternatives on the soil resource itself. These practices also would mitigate the effects to those organisms who populate the forest floor and subsurface.

INTRODUCTION TO VEGETATION ANAYLSIS

A discussion of suitable and unsuitable lands begins the timber resource section. The changes in age-class distribution and growth and yield are then outlined. The effects of the alternatives on insect and disease problems are summarized. Finally, the sequence of post-harvest reforestation and cultural work is presented. Noxious weeds are then discussed. The chapter concludes with a comparison of the alternatives' effects on the vegetation resource. The following issues, defined in Chapter 2, were the basis for developing the various alternatives included in this analysis.

○ **Timber Supply to Local Mills**

In the Record of Decision for the Forest Plan, Regional Forester Overbay established an Allowable Sale Quantity (ASQ) of 280 million board feet (MMBF) for the Idaho Panhandle National Forests. Each action alternative would contribute a proportion of the ASQ based on its estimated volume.

○ **Long-Term Sustained Yield**

In response to the issue of long-term sustained yield, each alternative is evaluated based on the number of acres brought into intensive management.

Another measure of long-term sustained yield is age-class distribution. The alternatives are compared to each other on the basis of the acreage and percentage of change in each condition class from the existing distribution.

○ **High-Risk Timber Stands**

Insects and disease problems are posing existing and potential threats to the timber resource of the Decision Area. White pine blister rust and mountain pine beetle are identified as the two most important pathogens. The timber stands were evaluated on the basis of risk to mountain pine beetle infestation and susceptibility to white pine blister rust. Those stands with a lodgepole pine and/or white pine component were classified as high risk. The alternatives are compared by the number of acres of high risk stands that would be treated.

THE TIMBER RESOURCE

Timber Suitability

The Forest Plan, page III-1, states that the boundaries of Management Areas are flexible to assure that the values identified are protected and to incorporate additional information gained from further on-the-ground reconnaisance and project planning.

One step of the West Moyie site-specific project analysis was to ground-check harvest units for suitability and the applicability of the harvest prescription and logging systems.

Minor corrections in the boundaries of suitable/ unsuitable lands within Management Areas 1 and 9 would be made for the selected alternative. Acres of suitable land within Management Area 9 and unsuitable land within Management Area 1 were located during on-the-ground reconnaissance (See project files).

Age-Class Distribution

The Forest Plan states "The forest will be managed for a balanced age-class distribution and long term sustained yield" (FS Plan, 1987). A favorable, balanced age-class distribution would occur when age classes were found in roughly equal amounts across the area. As discussed in Chapter 3, the West Moyie Decision Area is characterized by an unbalanced distribution of age classes. An excess of acres exists in the immature sawtimber condition class. All action alternatives would move toward balancing the distribution of condition classes. However, none of the alternatives would achieve a balanced age-class distribution in the short term.

On the following page, Table 4-16, Age-Class Distribution Comparison, compares the existing situation to projected changes in condition classes for each alternative. This table shows the acres of change, either increases or decreases, and the percent of area that each condition class would occupy if each alternative were to be implemented. These changes in age-class distribution also reflect the corresponding change in forest successional stages as previously discussed.

Growth and Yield

All action alternatives would place wild land under intensive management. Managed stands produce a higher volume through time than unmanaged stands. Regeneration of fast-growing trees of desired species, planting of genetically improved trees, stocking control to reduce competition and to improve growth of individual trees, and intermediate treatments to maintain the health and vigor of stands are silvicultural methods of maintaining the long-term sustained yield of forest stands. Regeneration harvests would produce the greatest effect of improving growth and yield among the various harvest methods.

AGE-CLASS DISTRIBUTION COMPARISON TABLE 4-16

Total Acres	Seed/Sap	Pole Tbr	Immature Saw	Mature Saw	Unsuitable Acres	Total Suitable Acres
Current Acres Current % Suitable	1,797 9.3%	1,378 7.1%	12,002 61.9%	4,216 21.7%	7,528	19,393

Alternative	Seed/Sap	Pole Tbr	Immature Saw	Mature Saw
B2 Acres Change % Suitable if Implemented	+1170 15.3%	0 7.1%	-930 57.1%	-240 20.5%
D Acres Change % Suitable if Implemented	+105 9.8%	0 7.1%	-105 61.3%	0 21.7%
E Acres Change % Suitable if Implemented	+165 10.1%	0 7.1%	-100 61.4%	-65 21.4%
EH Acres Change % Suitable if Implemented	+493 11.8%	0 7.1%	-343 60.1%	-150 21.0%
H Acres Change % Suitable if Implemented	+583 12.3%	0 7.1%	-338 60.1%	-245 20.5%
I Acres Change % Suitable if Implemented	+365 11.1%	0 7.1%	-235 60.7%	-130 21.1%
J1 Acres Change % Suitable if Implemented	+460 11.6%	0 7.1%	-285 60.4%	-175 20.8%
J2 Acres Change % Suitable if Implemented	+600 12.4%	0 7.1%	-465 59.5%	-135 21.0%
J2H Acres Change % Suitable if Implemented	+670 12.7%	0 7.1%	-465 59.5%	-205 20.7%
K Acres Change %Suitable if Implemented	+491 11.8%	0 7.1%	-326 60.2%	-165 20.9%

INSECTS AND DISEASE

White pine blister rust

Stands with a major component of white pine are rated as high risk to white pine blister rust. As discussed in Chapter 3, natural resistance to blister rust is less than one percent. Mortality of western white pine therefore, will continue to be heavy through the West Moyie Decision Area.

The future value of many of the natural stands will be greatly reduced as the high-valued white pine continues to die and represents an increasingly smaller proportion of each stand. All the action alternatives would include salvaging of the existing and potential mortality; the number of acres treated is shown in Table 4-17.

For each action alternative, significant increases in future volumes of western white pine can be expected where planting of this species is planned. The western white pine that would be planted has been bred to be resistant to blister rust. The genetic resistant factor is 50 percent. Therefore, 50 percent of the planted western white pine would reach sawlog size. In the future, plantations therefore would yield a higher proportion of western white pine than in natural stands.

Mountain pine beetle

Except for the No Action alternative, all alternatives would treat a portion of the lodgepole pine stands, thereby reducing the area for beetle infestation. Intermediate treatments including commercial thinning, basal area thinning, and sanitation/ salvage harvest would reduce the number of lodgepole pine stems per acre. By reducing the number of trees, the wider-spaced stands would be in a more vigorous condition and better able to withstand the beetle attack with a greater fly distance between trees (Cole, 1989).

Even-aged regeneration harvest would convert lodgepole pine stands into stands of a more mixed species composition, and thereby reduce the risk of future mountain pine beetle problems.

In the stands that will naturally regenerate heavily with lodgepole pine, two factors will be in favor of assuring that the stands can survive much longer than the existing natural stands:

1. By thinning to favor a good mix of species, the future stand will not be as susceptible to an epidemic or other catastrophic event as in the existing single-species stand; and

2. thinning also has the greatest potential for increasing or maintaining the vigor and growth of lodgepole pine trees and stands. This contributes greatly to strategies for long-term prevention of a mountain pine beetle epidemic (Cole, 1989).

Table 4-17, Reduction of High Risk Pine Stands, shows the range of treated acres among the alternatives.

Table 4-17

REDUCTION OF HIGH RISK PINE STANDS

Alternative	B2	D	E	EH	H	I	J1	J2	J2H	K
Acres Treated	681	675	413	1816	635	471	741	790	1996	1476
Percent of Risk Treated	20%	20%	12%	43%	18%	14%	21%	23%	58%	43

The potential for a serious and catastrophic wildfire would be greatly increased if the mountain pine beetle reaches epidemic stages in the lodgepole pine. The amount of fuel resulting from dead trees would rise dramatically. The majority of lodgepole pine being killed in the stands would create larger diameter fuels. Because of this, a fire would be of high intensity and long duration.

Topography in the Moyie River canyon is conducive to a rapid spread of a fire. A variety of potential ignition sources exist including lightning, railroad, residences, recreation users along the river and roads, and powerlines. For all action alternatives, however, existing harvest units and proposed units would retard fire spread by breaking up the continuity of fuels in the lodgepole pine areas.

Root Diseases

All action alternatives would include harvest systems and natural regeneration in stands where a high potential for root rots exist. Several alternatives propose an uneven-aged selection silvicultural system. A selection harvest would be the most affected by root rots as shade-tolerant Douglas-fir and grand fir would be the species which would regenerate most successfully in the shaded environment created by such harvest. In the presence of *Phellinius weirii* and *Armillaria*, very little regeneration of these two fir species would grow to maturity. Planting of root rot-resistant species such as larch, western white pine, or ponderosa pine would not be successful in the more shaded environment of a selection harvest because of the higher sunlight demands of these species.

All action alternatives would propose irregular seedtree and shelterwood harvests in areas of potential root rot infections. More opportunities would exist to successfully regenerate the stands with these prescriptions compared to a selection harvest. First of all, larch would be the target species among leave trees for natural regeneration. Larch is a species which has resistance to root pathogens. Secondly, other rot-resistant species such as western white pine and ponderosa pine would be underplanted in these units. Regeneration of these shade-intolerant pine species would succeed as more sunlight typically is available in these harvest systems than with a selection harvest. However, the trees would grow slower in an irregular seedtree or shelterwood harvest than with a clearcut harvest or regular seedtree or shelterwood harvest.

As defined in Appendix A, these harvest cuts are modified to leave more trees per acre than normally required for natural regeneration. Because of the higher density of leave trees, growth potential would be reduced due to the increased competition with the overstory trees for sunlight, nutrients, and water.

The action alternatives vary in the acreage of natural regeneration systems proposed in areas of high root rot potential.

Table 4-18

ACREAGE OF NATURAL REGENERATION PROPOSED IN STANDS OF HIGH ROOT ROT POTENTIAL

Alternative	B2	D	E	EH	H	I	J1	J2	J2H	K
Acres	245	295	60	333	308	240	211	303	303	283

In all action alternatives, stand growth and vigor would be increased and the mortality resulting from root disease would be reduced in those stands where species are converted to rot-resistant seral species. For the no action alternative and for those untreated stands in the root rot areas, mortality in all age classes and loss of timber volume would continue to increase in the grand fir and Douglas-fir species. Through time, unless an event such as a fire or harvest changes the species composition, these stands would become a mosaic of age classes of predominantly shade-tolerant species with few trees reaching merchantable size as root rot centers continue to expand.

Mistletoe

In the West Moyie Decision Area, western larch is the species most affected by mistletoe. In infected stands, all action alternatives would remove the majority of mistletoed trees during harvest operations. A clearcut harvest would be the most successful prescription as all mistletoed trees in both the understory and overstory would be cut.

In seedtree, shelterwood, and selection harvests, the infected residual overstory left to naturally regenerate the stand would be removed following successful regeneration. If the infected overstory is removed before the susceptible regeneration (i.e. western larch) reaches a height of three feet or ten years of age, there would be a reduced chance of the understory to become infected (Hadfield, 1978). Removal would be accomplished by logging, girdling, or felling the trees.

A loss of growth and vigor would continue to occur in those unharvested stands where mistletoe infection is heavy.

HARVEST, REFORESTATION, AND CULTURAL WORK

A range of possible even-aged and uneven-aged silvicultural systems were considered for each proposed unit. Harvest unit descriptions are detailed in Appendix A for each action alternative. A detailed description of the features of various silvicultural systems and their effects are included in the Forest Plan of the Idaho Panhandle National Forests. For all action alternatives, timber harvest and associated silvicultural treatment activities would occur in the following scenario:

1. Within a year following the harvest of the timber, site preparation for regeneration harvest units and fuel treatment would occur. Where possible, the units would be treated by prescribed burning. A variety of prescribed burning methods including broadcast burning, underburning, jackpot burning, and grapple piling/burning would be considered based on post-harvest conditions.

2. All units designated for artificial regeneration would be planted within a year following site preparation.

3. For the five years following planting or site preparation for natural regeneration, the stand would be surveyed two or three times to monitor regeneration success. Additional treatments would be prescribed as needed to ensure that full regeneration is completed within five years of the harvest.

4. Leave trees would be harvested from seedtree and shelterwood cutting units after conifer regeneration is established. A sufficient number of snag replacement trees would be left for cavity-dependent wildlife species.

5. In approximately fifteen or twenty years, the stand may be entered for a short period for precommercial thinning and "cleaning" of less desirable species to reduce stocking levels and competition and to maintain vigor and growth.

NOXIOUS WEEDS

For all action alternatives, the potential for noxious weeds to invade into uninfested areas of the Decision Area would increase. Ground disturbance along roads and within harvest units would create favorable conditions for their spread.

Because no additional areas would be roaded or harvested, Alternative A would have the smallest potential to increase noxious weeds in the Decision Area. The highest potential for spread would occur in Alternative B2. This alternative would include the most mileage of road construction and reconstruction and acres of harvest. The remaining action alternatives also would have a high potential for spread, related to the number of acres of ground disturbance.

To mitigate the spread of noxious weeds, all alternatives would follow the provisions of the Final Environmental Impact Statement (FEIS) for Weed Pest Management on the Idaho Panhandle National Forests. Included in the Weed Pest Management FEIS preferred alternative is a management program to use biological agents, herbicides, and cultural techniques to control or eradicate weed species. Existing infested areas within the Decision Area have been identified and scheduled for control work as discussed in Chapter 3.

For all action alternatives, Contract Clause C6.601 - Erosion Control Seeding, would be implemented to fertilize and grass-seed disturbed areas on specified skid trails, landings, and roadways. The seeding would retard the establishment of noxious weeds in those areas by ensuring rapid re-vegetation of disturbed sites.

Following post-sale activities new roads would be closed with earthen barriers or gates to restrict vehicular traffic. Vehicles are the primary means of the spread of noxious weeds. Following harvest activities, the area also would be monitored and surveyed for noxious weeds to assess the need for control work as discussed in the Weed Pest Management on the Idaho Panhandle National Forests FEIS.

CONSISTENCY WITH THE FOREST PLAN

The effects on the proposed actions on vegetation in the action alternatives would be consistent with the Forest Plan and National Forest Management direction for vegetation manipulation, regeneration and productivity.

COMPARISON OF ALTERNATIVES

Alternative A

No timber would be supplied to local mills or contributed toward the Allowable Sale Quantity in Alternative A.

No acres of regeneration harvest would be included in the no action alternative. No subsequent treatments to improve growth and yield through planting or stocking control would occur to maintain long-term sustained yield.

No change from the existing condition classes would occur in Alternative A. There would continue to be a disproportionate percentage of acres within the immature sawtimber condition class.

There would be no harvest in high risk pine stands. Salvage of existing mortality would not occur. If the expected mountain pine beetle epidemic occurs, the majority of lodgepole pine trees would be killed in each stand because the basal area of stands would not be reduced to withstand beetle attacks. The risk of a potential wildfire would be greatest in the no action alternative because of the larger acreage of heavy fuels resulting from extensive mortality. A transportation system would not be developed to provide access for personnel, equipment, and fire engines to a wildfire if epidemic conditions would occur.

Alternative B2

This alternative would contribute the largest volume, 21.1 million board feet (MBF) toward the Allowable Sale Quantity.

The largest acreage of regeneration harvest, 1170 acres, also would occur in this alternative. Alternative B2 therefore would place the largest number

of acres under immediate intensive management. Long-term sustained yield would be benefited by improving yields through 1090 acres of plantations, and future stocking control. The remaining acres of regeneration harvest would be naturally regenerated from on-site, high quality seed trees of mixed species.

Alternative B2 would create the greatest shift toward balancing condition classes. The acres of seedling/sapling stands would be raised from 9.3 percent to 15.3 percent and the immature saw component and mature saw component reduced by 4.8 percent and 1.2 percent respectively.

In terms of treating areas of insect and disease infestations, Alternative B2 would treat 20 percent, or 681 acres, of the high risk pine stands, the sixth highest acreage of planned treatments in this component among the action alternatives. Major mortality resulting from a mountain pine beetle epidemic would occur in the remaining 80 percent of the high risk stands.

Alternative D

A volume of 7.9 MMBF would be supplied by Alternative D. Of the action alternatives, this would contribute the third lowest volume or approximately 37 percent of the volume offered in Alternative B2.

Alternative D would place the fewest number of acres under immediate intensive management. Regeneration harvests would include 105 acres of shelterwood; these acres would be naturally regenerated. Of the action alternatives, Alternative D would have the lowest potential to improve future timber yields through plantations and stocking control.

This alternative would create the smallest shift among the action alternatives toward balancing age classes by converting only 105 acres of immature sawtimber by regeneration harvests into the seedling/sapling component, an increase of only 2.2 percent to that condition class.

Alternative D would be very similar to Alternative B2 in the number of acres of treatment of high risk pine stands (i.e. 675 acres). Major mortality resulting from a mountain pine beetle epidemic would occur in the remaining 80 percent of the high risk stands.

Alternative E

Alternative E would contribute the lowest volume of the action alternatives, 5.8 MMBF of timber, toward the Allowable Sale Quantity and local mills. This volume would be approximately a quarter of the amount offered by Alternative B2.

Like Alternative D, this alternative has a low acreage of proposed regeneration harvests, 165 acres, including 105 acres of seedtree and 60 acres of shelterwood harvests. Plantations would be completed on 65 acres with the remainder being natural regeneration. Therefore, this alternative also would not significantly improve long-term sustained yield.

After Alternative D, this alternative would create the second lowest shift toward balancing age classes by adding 165 acres to the seedling/sapling condition class and initiating regeneration harvest on 100 acres of immature sawtimber and 65 acres of mature sawtimber. The seedling/sapling condition class would therefore be 10.1 percent.

Of the action alternatives, the lowest acreage, 413 acres or only 12 percent of the high risk pine stands, would be treated. Major losses in timber volume would occur if a mountain pine beetle epidemic transpired on the remaining 88 percent of the high risk pine stands. The potential for a large-scale wildfire also would be higher than the other action alternatives because of the low acreage of high risk pine stands being treated.

Alternative EH

The volume of Alternative EH would be similar to the volume offered in the other new alternative, Alternative K, created since the West Moyie DEIS. This alternative would contribute 15,7 MMBF toward the Allowable Sale Quantity. It offers the fourth highest volume, or approximately 74 percent of Alternative B2.

Alternative EH would include 160 acres of seed tree and 333 acres of shelterwood harvest for a total of 493 acres brought into intensive manage-

ment. This acreage would rank fifth among the action alternatives. Of these acres, 85 acres would be planted.

The acreage of immature sawtimber would be reduced to 60 percent and the mature sawtimber component reduced to 21 percent. The seedling/sapling component would be raised to 11.9 percent. Alternative EH would rank fifth among the action alternatives in balancing age-class distribution.

The second highest percentage of high-risk stands would be treated in this alternative. Approximately 1816 acres, or 53 percent, of the total high risk acreage would be treated with various harvest treatments. Only Alternative J2H would exceed this alternative.

Alternative H

This alternative would be ranked in the middle of the action alternatives in terms of supplying timber to local mills and contributing volume toward the Allowable Sale Quantity. An estimated volume of 11.8 MMBF would be offered; this volume is 56 percent of the high-volume alternative.

Among the action alternatives, Alternative H would rank fourth in the number of acres brought into under immediate intensive timber management. Approximately 583 acres of regeneration harvests would be planned with 262 acres of plantations. Therefore, this alternative would have a moderate potential to improve long-term sustained yield.

Alternative H would create the fourth highest shift toward balancing age classes by adding 583 acres to the seedling/sapling component while initiating regeneration harvest on 338 acres of immature sawtimber and 245 acres of mature sawtimber. The seedling/sapling condition class would be 12.3 percent, and the immature sawtimber and mature sawtimber classes reduced to 60.1 and 20.5 percent respectively.

Approximately 635 acres of high risk pine would be treated in Alternative H, the third lowest number of acres among the action alternatives. A mountain pine beetle epidemic would affect the 82 percent of the high risk pine stands not treated in this alternative.

Alternative I

Alternative I would supply about a third of the volume offered by Alternative B2. Its volume of 7.2 MMBF is the second lowest of the action alternatives.

Regeneration harvest would be the third lowest, planned for 365 acres, among the action alternatives. Of those acres, 220 would be planted. Alternative I therefore would have a moderate potential of improving long-term sustained yield through intensive forest management.

This alternative also would result in the third lowest shift toward balancing age classes by adding 365 acres to the seedling/sapling component while initiating regeneration harvest on 235 acres of immature sawtimber and 130 acres of mature sawtimber.

Like Alternative E, Alternative I would treat a low acreage of high risk pine, 471 acres, which constitutes approximately 14 percent of the total high risk acreage. The possibility of a mountain pine beetle and potential wildfire would be high in this alternative.

Alternative J1

Alternative J1 would offer 11.2 MMBF toward the Allowable Sale Quantity; this equates to roughly half of the volume proposed in Alternative B2.

Approximately 330 acres of seedtree and 160 acres of shelterwood harvest would occur in Alternative J1; this would be seventh in ranking among the action alternatives in placing acres under intensive forest management. The regeneration harvests would include 107 acres of planting with the remainder being natural regeneration.

This alternative would be ranked seventh among the action alternatives in terms of balancing age classes. Approximately 460 acres would be added to the seedling/sapling condition class while initiating regeneration harvest on 285 acres of immature sawtimber and 175 acres of mature sawtimber.

Twenty-one percent of the high risk pine stands totalling 741 acres would be treated in this

alternative. This would be the fifth highest acreage of treated stands.

Alternative J2

A volume of 12.9 MMBF would be generated by Alternative J2. This volume would be approximately 61 percent of the volume offered by Alternative B2. Alternative J2 would generate the fifth highest volume of the action alternatives.

Alternative J2 would have the third highest acreage of planned regeneration harvests, 600 acres, including 75 acres of clearcut, 325 acres of seedtree, and 200 acres of shelterwood. Planting would be done on 197 acres, with natural regeneration prescribed for the remaining acres.

By adding 600 acres to the seedling/sapling condition class, Alternative J2 would rank as the third highest in terms of balancing age-class distribution. The proposed regeneration harvests would involve 465 acres of immature sawtimber and 135 acres of mature saw timber, or approximately a half of the harvest acres proposed in these components by Alternative B2.

Alternative J2 would enter 790 acres of high risk pine stands; this alternative would rank fourth among the action alternatives. This acreage would equate to 23 percent of all high risk pine stands.

Alternative J2H

An estimated volume of 19.3 MMBF would be contributed toward the Allowable Sale Quantity by this alternative. Alternative J2H would have the second highest volume, or approximately 92 percent of the volume supplied by Alternative B2. The primary difference between Alternative J2 and J2H would be the additional volume of 6445 MBF, which would be logged by helicopter.

Among the action alternatives, the second highest acreage would be placed into intensive management by this alternative. An estimated 670 acres of even-aged regeneration harvest would occur including 197 acres of plantations.

When compared to the other alternatives, Alternative J2H would rank second in creating a shift toward balancing age-class distribution by adding 670 acres to the seedling/sapling component while initiating regeneration harvests on 465 acres of immature sawtimber and 205 acres of mature sawtimber. The difference between Alternatives J2 and J2H would involve the addition of 70 acres of proposed regeneration harvests in the mature sawtimber condition class under this alternative.

Alternative J2H would treat 1996 acres, or 58 percent, of the high risk pine stands; this would be the highest acreage among the alternatives. A variety of intermediate treatments would be employed including 719 acres of basal area thinning. In addition to creating an environment less conducive to beetle infestations, future mortality would be harvested as green sawlogs. The chances of a population build-up in the remaining 42 percent of the untreated stands also would be greatly reduced. The potential for a catastrophic wildfire also would be reduced by treating a high acreage of high risk stands.

Alternative K

The third largest volume, 15.9 MMBF, would be contributed toward the Allowable Sale Quantity by this alternative. This volume would equate to 76 percent of the volume supplied by Alternative B2.

Alternative K would prescribe 413 acres of even-aged regeneration harvests including 140 acres of seed-tree harvest and 273 acres of shelterwood harvest. The majority of acres would be reforested with natural regeneration with 197 acres of planting. An additional 78 acres of group-selection harvest also would be naturally regenerated. The total acreage would be 491 acres of the Decision Area brought into intensive management.

This alternative is similar to Alternative EH in balancing age-class distribution. Approximately 491 acres including 326 acres of immature sawtimber and 165 acres of mature sawtimber would be moved into the seedling/sapling component.

Approximately 43 percent of the high risk pine stands would be treated in Alternative K. This alternative ranks behind only Alternatives J2H and EH in number of high risk acres treated.

Introduction

The Decision Area contains a range of recreation opportunities. The recreation facilities and settings forest visitors experience can be affected by changes to the characteristics of the area and changes to the facilities.

This section shows the results of Recreation analysis of the alternatives. Effects Common to All Alternatives includes Alternative A, No Action. Effects Common to All Action Alternatives discusses the changes common to all other alternatives.

The acres of change and the percent of the area changed are shown as one way to compare alternatives. Tables for the trail miles lost due to road construction and the miles of trail which would undergo a change in Recreation Opportunity Spectrum class summarize other quantitative effects of the alternatives.

The narrative for each alternative explains the on-the-ground effect of that alternative and describes the feel of the area if the alternative were implemented. A description of an effect common to more than one alternative may be shared by those alternatives and not repeated throughout the text. This will be referenced in the alternative descriptions.

Recreation Opportunity Spectrum (ROS) is used to define outdoor recreation settings, activities, and experiences through ROS classes. See Chapter 3, page 78 for general descriptions. The 1986 ROS Book definitions are included in the Glossary of this Final EIS.

ROS classes were determined for each alternative to analyze changes in recreation opportunities. The Decision Area existing ROS Classes are shown on map Figure 3-21, page 3-77B. Maps used in the ROS analysis are located in the West Moyie EIS project file. A comparative analysis was also completed for modifications to the trails system and the results are presented in this section.

Effects Common to All Alternatives

The campgrounds at either end of the Decision Area would not be physically changed by any of the alternatives considered. The recreation experience at the facilities may be altered by some alternatives which reduce the scenic qualities of the Decision Area, especially along road corridors leading to the campgrounds.

Fishing by forest users is unlikely to be affected by any alternative. Fishing activity occurs primarily on the Moyie River and at Sinclair Lake where any impacts to fisheries would be so slight as to not be noticeable.

There would not be any significant changes (additions) in the motorized access to the area because all new road construction would be closed at the conclusion of management activities. Motorized use by forest visitors may increase during those activities, primarily for firewood removal, depending upon the method of road closures.

The Rural ROS class, located primarily on private lands, remains constant throughout all the alternatives. Rural opportunities would continue to be approximately 2600 acres.

One outfitter and guide who has a permit in the Decision Area would be able to continue to use the area much as he has in the past. Segments of trails lost in some alternatives would not significantly affect his operation as long as trails retained in the system are protected during logging activities and trail maintenance is performed as scheduled under the trails maintenance plan (Sweet, 1989).

Reasonably Foreseeable Future Actions

Pacific Gas Transmission (PGT) has proposed construction of a new gas pipeline adjacent to the pipeline that crosses a portion of the Decision Area along the Moyie River. The project, scheduled to occur between 1992 and 1994, is currently under analysis and PGT is preparing an EIS. The effects of this project, most noticeable during construction, would be increased heavy equipment and truck traffic and noise from construction

activities. Visual effects noticed by recreation users would be greatest prior to revegetation of the expanded utility corridor.

Other foreseeable actions common to all alternatives include overstory removal on seedtree and shelterwood units, salvage harvest, fuelwood gathering, and limited mineral exploration. Impacts from these activities would center around existing roads and consist predominately of sound and visual disturbances associated with equipment. These actions would not significantly alter recreation opportunities; especially when compared to any of the action alternatives.

Effects Common to All Action Alternatives

Timber harvest would result in logging traffic past campgrounds and on roads used for dispersed recreation. Such common use of the area detracts from the recreation experience of some users. This impact is most likely to occur on weekdays when the majority of the logging traffic would occur. In addition to logging traffic, there would be noise from logging and road construction machinery, sawing, and blasting. When noticed by recreation users it would affect the sense of solitude for dispersed users. This effect would occur during the timber harvest activities and be heard up to one to two miles from the source.

Effects Common to Alternatives B2, D, H, I, J1, J2, J2H, AND K

All alternatives with the exception of Alternatives A, E, and EH would result in the loss of some portion of the existing trails system in the Decision Area.

Several respondents to the Draft EIS questioned whether it was possible to reduce the impact to the trail system caused by roading and logging. Quite often trails are located in or near the optimal location for roads. During alternative development the ID Team looked at ways to minimize the interaction between the road and trail systems.

In some instances it was possible to access suitable timber producing lands without impacting trails. In other cases, existing trails (i.e. trail # 32, 152, and 225) were located in the only suitable road location. Impacts to trails in Management Areas 1 and 4 from road construction and timber harvesting are consistent with Forest Plan Standards.

The miles of trail reduction varies. The following table displays the miles of trail lost by alternative:

TABLE 4-19

Trail Miles Lost Due to Road Construction

Alternative	B2	D	E	EH	H	I	J1	J2	J2H	K
Trail:										
Sidehill #415	0	0	0	0	0	0	0	0	0	0
Rutledge #152	0.65	0.65	0	0	0	0.65	0	0	0	0
Bussard Mtn. #32	1.61	0.51	0	0	0.48	0.48	0.48	0.48	0.48	0
Snyder Guard Station #307	0	0	0	0	0	0	0	0	0	0
Danquist #225	0.86	0	0	0	0.33	0.33	0.33	0.33	0.33	0.33
Hellroaring Ridge #34	0	0	0	0	0	0	0	0	0	0
Total	3.12	1.16	0	0	0.81	1.46	0.81	0.81	0.81	0.33

ALTERNATIVE A

Recreation Opportunities

The Recreation Opportunity Spectrum (ROS) inventory would not change from what is currently inventoried.

ROS Class	Acres	Change
Semi-Primitive Motorized	6053	0 %
Roaded Natural	6298	0 %
Roaded Modified	5759	0 %

The remaining 516 acres of National Forest ownership within the Decision Area is inventoried as Rural (ROS Class). This would not change with any of the alternatives.

Recreation Facilities and Use

There would be no impacts to any trails and recreation use would continue at current levels or with gradual increases as population levels of recreation users increase.

ALTERNATIVE B2

Recreation Opportunities

Alternative B2 would result in the greatest changes to the physical setting of the area and the recreation opportunities. Of all alternatives considered, this is the only one which would eliminate the Semi-Primitive ROS class from the Decision Area. It would also create the greatest amount of Roaded Modified acres. The loss of semi-primitive recreational settings would be a long term loss greater than 100 years, or an irretrievable loss if additional disturbances were to occur.

ROS Class	Acres	Change
Semi-Primitive Motorized	0	-100%
Roaded Natural	7486	+19%
Roaded Modified	10624	+84%

Recreation Facilities and Use

All trails are affected by this alternative. Two-thirds of a mile of Rutledge Trail #152 near the Twin Bridges would be eliminated and a new trailhead would need to be developed to replace it. The trail would also pass through several regeneration harvest units. The effected portion of the trail could be relocated around most of the regeneration units at an estimated cost of $40,000.

Bussard Trail #32 would be impacted by units near both of its endings. Protection of the effected segment adjacent to the valley would be very difficult because the trail switchbacks several times through the proposed regeneration harvest unit. Moving this segment is especially difficult because harvest units are planned in all areas where relocation would have been feasible.

The Danquist Trail #225 would lose 0.84 miles of trail. Two new roads would intersect the northern portion of the trail reducing actual trail miles and increasing road access to the trailhead by several miles.

The ROS class would change along all trails. Changes would be in varying degrees from the Primitive/Semi-Primitive classes toward the Rural class. Over a portion of their length, all trails are shifted from Semi-Primitive Motorized to Roaded Natural. Some portions of trails are moved from Semi-Primitive to Roaded Modified; others from Roaded Natural to Roaded Modified.

Recreation use that favors a less modified natural environment would decline. A reduction in use is most likely to occur on Sidehill Trail #415, Bussard Trail #32, and Danquist Trail #225. New roads and regeneration units would change the current character of these trails the most. Recreation activities more compatible with settings where human modification is dominant or co-dominant could increase, especially if motorized use is permitted on new road construction.

The ROS class would be changed on half of the existing trail system (18.07 miles of trail). The following chart displays the changes that would occur:

TABLE 4-20 Alternative B2 Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative B2				
Sidehill #415	0	2.06	2.38	1.0
Rutledge #152	0.65	3.11	0.41	0
Bussard Mtn. #32	1.61	1.85	1.70	0.32
Snyder Guard Station #307	0	0	0.07	0.58
Danquist #225	0.86	2.23	1.78	0
Hellroaring Ridge #34	0	0.58	0	0
Total	3.12	9.83	6.34	1.9
Total ROS Change 18.07 MI				

SPM = Semi-primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

ALTERNATIVE D

Recreation Opportunities

This alternative would construct some new roads and all timber harvest prescriptions are other than regeneration harvest. Changes to existing ROS class designation would occur primarily where harvest changes Semi-Primitive Motorized to Roaded Natural.

ROS classifications are as follows:

ROS Class	Acres	Change
Semi-Primitive Motorized	3815	-37%
Roaded Natural	8345	+33%
Roaded Modified	5950	+ 3%

The loss of Semi-Primitive motorized acres is a long term loss greater than 100 years. The loss would not be permanent if new roads were allowed to deteriorate into primitive roads and additional disturbances did not occur.

Recreation Facilities and Use

All changes in settings experienced by trail users reflect the changes from Semi-Primitive Motorized to Roaded Natural in areas of new timber harvest units. Total trail miles affected is 7.35. The Sidehill Trail #415 would have more trail mileage affected than other area trails.

Two-thirds of a mile of Rutledge Trail #152 adjacent to the valley would be crossed twice by new road construction and subsequently deleted from the maintenance program. The segment affected climbs from a pine stand into mixed conifer and hardwood stands and has occasional views of the valley.

The Bussard Mountain Trail #32 would be shortened by 0.38 miles. The trail segment lost is primarily flat and straight. It runs along a fence line seperating federal and private lands.

Upon completion of all management activities new roads would be closed. Users of the Rutledge Trail and the Bussard Mountain Trail would access the remaining trail by using a closed road. Closed

roads can be ripped and seeded to give them a more natural appearance.

It is expected that non-hunting recreation use would be reduced by this alternative due to modification of settings and the effects new roads would have on trails. Effects on trails and use where harvest units overlay existing trails can be minimimized by prescribing "lighter" cutting activities along trails, identifying trail protection corridors, and disposing of slash away from the trail corridor.

A summary of changes is shown in the following chart:

TABLE 4-21 Alternative D Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative D				
Sidehill #415	0	4.07	0	0
Rutledge #152	0.65	1.56	0	0
Bussard Mtn. #32	0.51	0.71	0	0
Snyder Guard Station #307	0	0.06	0	0
Danquist #225	0	0.37	0	0
Hellroaring Ridge #34	0	0.58	0	0
Total	1.16	7.35	0	0
Total ROS Change 7.35 MI				

SPM = Semi-Primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

ALTERNATIVE E

Recreation Opportunities

Of all the action alternatives, this alternative modifies the existing recreation opportunities the least. There would be no modification of the Semi-Primitive motorized acreage, and a minor conversion of Roaded Natural to Roaded Modified acreage as shown:

ROS Class	Acres	Change
Semi-Primitive Motorized	6053	0 %
Roaded Natural	6006	-5%
Roaded Modified	6051	+5%

Recreation Facilities and Use

Only one harvest unit is located immediately adjacent to existing facilities. Proposed unit 33 is a shelterwood unit whose boundary would lie next to Bussard Mountain Trail #32. The trail could be protected from direct physical impact. The trail user's visual effect from the unit would vary over time. The immediate impact would leave 30-40 trees per acre which would be a relatively mild visual modification. The second entry would remove all but three to five snags or snag replacements when the understory of trees two to five feet in height are established. This would be a greater visual modification.

There would be no other impacts to any trails and recreation use would continue at current levels or gradually increase as the level of recreation users increases.

ALTERNATIVE EH

Recreation Opportunities

Compared to all other action alternatives, with the exception of Alternative E, EH would cause less change from the primitive end of the spectrum to the more modified ROS classes.

ROS Class	Acres	Change
Semi-Primitive Motorized	4388	-27%
Roaded Natural	7243	+15%
Roaded Modified	6479	+12%

Where helicopter units would be located in areas currently classified as Semi-Primitive, the resulting ROS class was determined from the residual canopy closure and residual logging slash. If the stand was modified such that canopy closure was 30 percent or less, and all slash remained on the unit, the stand and immediate area were reclassified as Roaded Modified. All other areas associated with helicopter units were classified as Roaded Natural.

Logging slash in the helicopter units will be left to degrade naturally. The foreground visual effects of most helicopter units could be reduced by leaving additional trees along recreation trails and directional falling trees away from trails.

Recreation Facilities and Use

Most changes in setting experienced by trail users would occur on the Sidehill Trail #415 and the Rutledge Trail #152. The changes would be conversion of Semi-Primitive Motorized to either Roaded Natural or Roaded Modified. Length of all existing trails would not change.

A summary of the changes is shown in the following table:

TABLE 4-22 Alternative EH Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative EH				
Sidehill #415	0	2.50	0.65	0
Rutledge #152	0	1.69	0	0
Bussard Mtn. #32	0	0	0	0
Snyder Guard Station #307	0	0.07	0	0
Danquist #225	0	0	0	0
Hellroaring Ridge #34	0	0	0	0
Total	0	4.26	0.65	0
Total ROS Change 4.91 Mile				

SPM = Semi-Primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

ALTERNATIVE H

Recreation Opportunities

The Semi-Primitive Motorized class would be reduced by nearly half of its current acreage with all of the modified acres converted to the Roaded Modified class as shown:

ROS Class	Acres	Change
Semi-Primitive Motorized	3388	-44%
Roaded Natural	6209	- 1%
Roaded Modified	8513	+48%

The loss of Semi-Primitive acres is long term. To prevent a permanent loss, roads would have to be allowed to deteriorate while other additional disturbances did not occur.

Recreation Facilities and Use

Almost half of the changes to ROS settings along trails would be from Semi-Primitive Motorized to Roaded Natural. The greatest changes would occur to Sidehill Trail #415 due to shelterwood units near the mid-way point of the trail. Both ends of Rutledge Trail #152 would be altered by shelterwood cuts near the valley termini. A clearcut in the East Fork Meadow Creek drainage would be visible from the trail west of Queen Mountain.

The loss of trail miles for the Danquist Trail #225 and Bussard Mountain Trail #32 would be accompanied by road closures on new roads. Users would follow a closed road to access the remaining trail. Mitigation of this effect could include ripping and seeding closed roads or construction of a new trail segment on the Danquist trail.

The changes to the existing conditions and ROS settings would likely affect recreation use of the area. The conversion of some settings from Semi-Primitive to Modified would have its greatest effect on trail users seeking a Semi-Primitive experience.

Total changes in ROS classes is 9.48 miles.
A summary of changes is shown in the following table:

TABLE 4-23 Alternative H Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative H				
Sidehill #415	0	2.53	1.61	0.79
Rutledge #152	0	1.00	0.69	0.56
Bussard Mtn. #32	0.48	0.70	0	0.21
Snyder Guard Station #307	0	0.07	0	0
Danquist #225	0.33	0	0.41	0.33
Hellroaring Ridge #34	0	0.58	0	0
Total	0.81	4.88	2.71	1.89
Total ROS Change 9.48 MI				

SPM = Semi-Primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

ALTERNATIVE I

Recreation Opportunities

The changes in acreages of exisiting ROS classes would be similiar to those in Alternative H except that reductions of Semi-Primitive acres would not be solely to Roaded Modified:

ROS Class	Acres	Change
Semi-Primitive Motorized	3388	-44%
Roaded Natural	6867	+ 9%
Roaded Modified	7855	+36%

The loss of Semi-Primitive Motorized acres is a long term loss which cannot be regained unless roads are allowed to deteriorate while other additional disturbances do not occur.

Recreation Facilities and Use

The greatest changes occur on the Sidehill Trail #415 and the Rutledge Trail #152. The single most direct effect on the Sidehill Trail is the result of unit 20's seed tree harvest location near the trail's mid section. The trail user would experience primitive or natural settings along most of the trail after leaving the trailhead, with the exception of the changed environment encountered as they passed through this unit. This setting modification would be emphasized with a second entry which would occur five to ten years after the initial entry.

Rutledge Trail #152 is reduced in length and the setting is altered from Semi-Primitive Motorized to Roaded Modified adjacent to the new termini. The trail is indirectly affected by proposed clearcut units in the East Fork Meadow Creek drainage which would be seen from view points along the trail west of Queen Mountain.

Unlike other alternatives, this alternative would close roads other than newly constructed roads to enhance wildlife habitat security. These additional closures change recreation uses associated with trails as well as roads. All trails except Snyder Trail #307 and Hellroaring Trail #34 are affected.

For the other trails, use would begin at a road closure and access to the trail would include a closed road. The setting associated with a new road could be modified toward a trail setting if the road was reclaimed by ripping and revegetating.

It is expected that the loss of segments of three trails, the additions of road segments to trails, and the change of ROS settings would decrease use of the trails by non-hunting horse/hiker users. Hunter use of the trails would likely remain the same or increase since units provide openings and forage sites which are commonly hunted. New year-round road closures on existing roads would decrease the amount of hunting from open roads but would be replaced to a limited extent by hunters seeking non-motorized hunting areas. Most roads in the Hellroaring Creek drainage and all roads in the Little Hellroaring drainage would be closed year-round.

Most changes in ROS settings would be from Semi-Primitive Motorized (SPM) to Roaded Natural and Roaded Modified as shown on the following chart.

TABLE 4-24 Alternative I Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative I				
Sidehill #415	0	2.69	1.34	0
Rutledge #152	0.65	1.00	0.60	0
Bussard Mtn. #32	0.48	0.70	0	0
Snyder Guard Station #307	0	0.70	0	0
Danquist #225	0.33	0	0.41	0.33
Hellroaring Ridge #34	0	0.58	0	0
Total	1.46	5.04	2.35	0.33
Total ROS Change 7.72 MI				

SPM = Semi-Primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

Alternative J1

Recreation Opportunities

This alternative identifies new options to harmonize management activities with the natural environment and other resource concerns. If the desired conditions occur in practice as they are identified in theory, recreation experience and use would be mildly affected. Recreation facilities could be enhanced with appropriate post-sale projects such as trailhead relocation, directional signing to recreation features and facilities, interpretive signing, and new trail construction for Danquist Trail #225.

This alternative modifies the existing ROS conditions the least, other than Alternatives A, E and EH, as shown in the table.

ROS Classes	Acres	Change
Semi-Primitive Motorized	4176	-31%
Roaded Natural	7178	+14%
Roaded Modified	6756	+17%

Much of the change is from Semi-Primitive to Roaded Natural. This single class shift is due to several shelterwood harvest units with a revised prescription to retain overstory trees longer and in greater numbers than standard shelterwood prescriptions. The natural environment is changed to a lesser extent, especially at the second entry. There would be a short period of about two years when the harvest activities would be very noticeable but would quickly change once the slash is burned and the ground vegetation begins to cover the forest floor.

The second entry would occur 10 to 20 years after the first entry, or when regeneration is six to 15 feet in height. This would mitigate the loss of part of the residual overstory. The change in acreage from Semi-Primitive is primarily to Roaded Natural.

Recreation Facilities and Use

The changes of the area as a whole are reflected in the changes in settings along the trails. The primary changes are from Semi-Primitive to Roaded Natural. The Bussard Mountain Trail #32 and the Rutledge Trail #152 would be bordered along some segments by shelterwood units with harvest schedules structured for visual concerns. The shelterwood units would be noticed but should not dominant the user's view and feeling for the effected area.

As is the case with Alternatives H and I, a regeneration unit near the midpoint of the trail contrasts with the natural forest setting on several miles of trail on either side of the unit.

Two trail segments, the lower ends of the Danquist Trail #225 and the Bussard Mountain Trail #32, would be lost due to road construction. Access to these trails may be by closed road. This effect can be mitigated on the Danquist Trail #225 by construction of a new connecting trail segment. Mitigation on the Bussard Mountain Trail #32 would include ripping and seeding of the access road, which would likely be a temporary road.

The following table displays changes in the ROS classes along the trails.

TABLE 4-25 Alternative J1 Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative J1				
Sidehill #415	0	3.77	0.21	0.1
Rutledge #152	0	0.69	0	0
Bussard Mtn. #32	0.48	0.69	0	0
Snyder Guard Station #307	0	0	0.07	0
Danquist #225	0.33	0	0.41	0.33
Hellroaring Ridge #34	0	0.58	0	0
Total	0.81	5.68	0.69	0.43
Total ROS Change 6.8 MI				

SPM = Semi-Primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

ALTERNATIVE J2

Recreation Opportunities

Changes in ROS classes for this alternative are:

ROS Classes	Acres	% Change
Semi-Primitive Motorized	3388	-44
Roaded Natural	7233	+15
Roaded Modified	7489	+30

Alternatives J2 and J1 are similar with shelterwood units which have special visuals consideration. These units and partial cut units add to the Roaded Natural ROS class.

Recreation Facilities and Uses

The greatest mileage of trails effected is almost four miles on the Sidehill Trail #415. The majority of the ROS class change is from Semi-Primitive to Roaded Natural (3.33 miles). There are four units in the midsection of the trail; two seed tree, one salvage, and one visually revised shelterwood.

Rutledge Trail #152 would be bordered by two modified shelterwood cuts and a basal area thinning. The existing trail is to be protected, so no trail miles would be lost. Clearcut units in the East Fork Meadow Creek drainage would be distinctly visible from the meadows the trail crosses west of Queen Mountain.

The Bussard Mountain Trail #32 and Danquist Trail #225 would be intersected by new road construction. To mitigate this impact, a new trail segment could be constructed for the Danquist Trail #225 and the road affecting the Bussard Mountain Trail #32 could be ripped and seeded.

The Snyder Trail #307 would pass through one seed tree unit and two salvage units. In addition a road would cross the trail. Opportunities to relocate the trail away from roads are very limited. Reclamation of the road is probably the best mitigation under this alternative.

Harvest prescriptions adjacent to trails attempt to provide some degree of mitigation as the existing condition is altered. The number of units encountered is likely to reduce the number of non-hunting recreationists.

The following table summarizes the changes in the ROS Classes

TABLE 4-26 Alternative J2 Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative J2				
Sidehill #415	0	3.33	0.65	0.1
Rutledge #152	0	1.69	0	0
Bussard Mtn. #32	0.48	0.70	0	0
Snyder Guard Station #307	0	0	0.07	0.58
Danquist #225	0.33	0	0.41	0.33
Hellroaring Ridge #34	0	0.58	0	0
Total	0.81	6.30	1.13	1.01
Total ROS Change 8.44 MI				

SPM = Semi-Primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

ALTERNATIVE J2H

Recreation Opportunities

Other than Alternative B2, this alternative reduces the Semi-Primitive ROS class to the greatest extent. In helicopter unit areas in which the existing ROS class is typically Semi-Primitive, the resulting ROS class was determined from residual canopy closure and amounts of logging slash. Stands with 30 percent canopy closure or less, with all slash remaining on the unit, were classified Roaded Modified. All other areas were classified Roaded Natural.

ROS changes for the area are:

ROS Classes	Acres	Change
Semi-Primitive Motorized	2854	-53%
Roaded Natural	7002	+11%
Roaded Modified	8254	+43%

Recreation Facilities and Uses

The effects identified in Alternative J2 also occur in this alternative. The difference between the two alternatives is the effects of the helicopter units. These effects are seen from the Sidehill Trail #152 and Rutledge Trail #415. Rutledge Trail would pass through helicopter units which convert Semi-Primitive to Roaded Natural. Segments of the Sidehill trail would become both Roaded Natural and Roaded Modified. Some portions pass through the edges of units and mitigation could include moving units boundaries to eliminate direct effects to the trail users. In other units mitigation could include marking a corridor to screen the visual effects of the unit.

This alternative's effects on use would also be similiar to Alternative J2 except there may be a reduction in hunter use of areas around helicopter units. Slash would not be treated in these harvest units and may impede hunting activities. Extensive Roaded Modified settings may be disfavored in a backcountry hunting experience.

ROS class changes under this alternative:

TABLE 4-27 Alternative J2H Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative J2H				
Sidehill #415	0	2.37	1.89	0.92
Rutledge #152	0	2.65	0	0
Bussard Mtn. #32	0.48	0.70	0	0
Snyder Guard Station #307	0	0	0.07	0.58
Danquist #225	0.33	0	0.41	0.33
Hellroaring Ridge #34	0	0.58	0	0
Total	0.81	6.33	2.37	1.83
Total ROS Change 10.5 MI				

SPM = Semi-Primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

ALTERNATIVE K

Recreation Opportunities

This alternative would cause a 49 percent reduction in the Semi-Primitive ROS class. Only alternatives B2 and J2H would cause a larger reduction in this ROS class. In helicopter unit areas in which the existing ROS class is typically Semi-Primitive, the resulting ROS class was determined from residual canopy closure and amounts of logging slash. Stands with 30 percent canopy closure or less, with all slash remaining on the unit, were classified Roaded Modified. All other areas were classified Roaded Natural.

ROS changes for the area are:

ROS Classes	Acres	Change
Semi-Primitive Motorized	3136	-49%
Roaded Natural	7610	+21%
Roaded Modified	7364	+28%

Recreation Facilities and Uses

Most of the effects identified in Alternative J2H also occur in this alternative; however, there would be one less mile of trails affected by this alternative. The difference between the two alternatives is the effects of the helicopter units. There is less disturbance to the Sidehill Trail #152 because there are fewer helicopter units with this alternative. Rutledge Trail would pass through helicopter units which convert Semi-Primitive to Roaded Natural. Segments of the Sidehill trail would become both Roaded Natural and Roaded Modified.

Less trail mileage would be lost due to road construction as compared to Alternative J2H, as the mileage of the Bussard Mountain Trail #32 would not change. Some portions pass through the edges of units and additional mitigation could include moving units boundaries to eliminate direct effects to the trail users. In other units additional mitigation could include marking a corridor to screen the visual effects of the unit.

This alternative's effects on use would also be similiar to Alternative J2H. There may be a reduction in hunter use of areas around helicopter units. Slash would not be treated in these harvest units and may impede hunting activities. Extensive Roaded Modified settings may be disfavored in a backcountry hunting experience.

ROS class changes under this alternative:

TABLE 4-28 Alternative K Miles ROS Class Changes

Trail	Miles Lost due to Road Construction	SPM -> RN	SPM -> RM	RN -> RM
Alternative K				
Sidehill #415	0	2.64	1.37	0.88
Rutledge #152	0	2.65	0	0
Bussard Mtn. #32	0	0.70	0	0
Snyder Guard Station #307	0	0	0.07	0.58
Danquist #225	0.33	0	0.41	0.33
Hellroaring Ridge #34	0	0.58	0	0
Total	0.33	5.87	1.85	1.79
Total ROS Change 9.5 MI				

SPM = Semi-Primitive Motorized, RN = Roaded Natural, RM = Roaded Modified

INTRODUCTION

Cultural resources that are eligible for listing on the National Register of Historic Places can be reduced in value by any change in the quality of their historical, architectural, archeological, or cultural character. The criteria for eligibility are listed in 36 CFR 60.4 and Section 101 (a)(1)(a) of the National Historic Preservation Act of 1966.

The American Indian Religious Freedom Act of 1978, protects the "inherent right of freedom to believe, express, and exercise their traditional religions." This includes, but is not limited to, access to sites, use and possession of sacred objects, and the freedom to practice traditional worship ceremonies. Ground-disturbing activities and increased access to remote areas could potentially affect historic and prehistoric sites.

The potential for disturbing cultural resources in the project area is greatest where road and trail construction, timber harvest, and site preparation activities are proposed. Cultural resources can also be affected by recreation developments and by people using the area for recreation.

Cultural resource inventories are required prior to road construction, timber harvest, and other ground-disturbing activities. Other compliance procedures required under section 106 of the National Historic Preservation Act must be observed.

Cultural resource inventories on the Idaho Panhandle National Forest are undertaken in accordance with Executive Order 11593, 36 CFR 800, 36 CFR 63 and FSM 2360. The process is based on field work guided by background research, as well as random sample. The district archeologist maintains contact with the Forest archeologist for more difficult problems.

Kootenai Indian Tribe

The district archeologist consults and informs the Kootenai Tribal Historian of project areas, potential impacts, and shares potential site and recorded site information. Cultural Resource Inventory results are discussed when sensitive areas have been included in a project area.

Effects Common to All Action Alternatives

Cultural sites are known to exist in areas proposed for timber harvest in each alternative. Decisions have been made to avoid, protect, or mitigate in accordance with the National Historic Preservation Act.

All alternatives would impact areas that have been identified as having high potential for prehistoric sites. Prior to sale award, these areas would be reassessed to determine if the site exists. If the sites do exist, a decision to avoid, protect, or mitigate in accordance with the National Historic Preservation Act would be necessary prior to implementation. The prehistoric sites have a high probability of not being identifiable without soil disturbance, i.e. road construction (Sims C, 1991). In such an event, the road locations will be reviewed during the construction phase to determine if these sites do exist. Special Contract Provision "C6.23# Protection of Cultural Resources" will be used to protect the site.

Reasonably Foreseeable Future Actions

All reasonably foreseeable future actions identified in Chapter One have the potential to impact cultural sites. Cultural resource clearance will be required for all future projects at the planning stage for each proposal.

Consistency with the Forest Plan

The proposed timber sales are all presently in compliance with Section 106 of the National Historic Preservation Act and the Forest Plan. There has been adequate inventory coverage on all potential impact areas within the Decision Area. Cultural resources have been recorded and significant cultural resources have been protected from adverse impact.

Alternative A - There will be no harvesting or new road construction with this alternative. Since this alternative does not introduce any new activities, no effects would occur to the existing inventoried cultural sites or unidentified cultural sites in the Decision Area.

Alternative B2 - The cutting units and roads proposed for this alternative would impact 11 recorded historic sites that have been recommended for site protection. Eight of these are trails that require their continuity be maintained. This would be accomplished by leaving the trails marked and open in their original location following harvest. The remaining three sites would require minor adjustments to three unit boundaries to avoid site impacts. Road construction would also improve access to one of these sites, increasing the potential for site disturbance.

Cutting units 1, 10, 12, and 38 are located in areas that have recently been identified as having high potential for prehistoric sites.

Alternative D - The cutting units and roads proposed for this alternative would impact seven recorded historic sites that have been recommended for site protection. Six of these are trails. Mitigation for these trails would be accomplished by leaving the trails marked and open following harvest. A minor adjustment of one unit boundary would be required to protect the other site.

Cutting units 1 and 109 are located in areas that have recently been identified as having high potential for prehistoric sites.

Alternative E - This alternative would impact four recorded sites that have been recommended for site protection. These are all trails that require marking and opening of their original route following harvest. This alternative would have very little impact on cultural resources.

Cutting unit 1 is located in an area that has recently been identified as having high potential for prehistoric sites.

Alternative EH - The cutting units proposed for this alternative would impact six recorded historic sites. five of these are trails that require marking and clearing of the original routes following harvest. The remaining site would require boundary adjustments on one unit to avoid impacting the site.

Cutting units 1, 1A, 10, 12, and 147 are located in areas that have recently been identified as having high potential for prehistoric sites.

Alternative H - The cutting units and roads proposed for this alternative would impact five recorded historic sites. Four of these are trails that require marking and opening of thier original routes following harvest. An adjustment of one unit boundary would be required to protect the other site.

Cutting units 1, 10, and 12 are located in areas that have recently been identified as having high potential for prehistoric sites.

Alternative I - The cutting units and roads proposed for this alternative would impact six recorded historic sites. All of these are trails that require marking and opening of their original routes following harvest.

Cutting units 1, 10, 10A, 12, and 38 are located in areas that have recently been identified as having high potential for prehistoric sites.

Alternative J1 - The cutting units and roads proposed for this alternative would impact six recorded historic sites. Four of these are trails that require marking and clearing of the original routes following harvest. The remaining two would require boundary adjustments on two units to avoid impacting the sites. One of these is a National Register site.

Cutting units 1, 1A, 10, and 12 are located in areas that have recently been identified as having high potential for prehistoric sites.

Alternative J2 - The cutting units and roads proposed for this alternative would impact five recorded historic sites. Three of these are trails that require marking and opening of the original routes following harvest. The remaining two would require adjustments to two unit boundaries to avoid impacting these sites. One of these is a National Register site.

Cutting units 1, 1A, 10, and 12 are located in areas that have recently been identified as having high potential for prehistoric sites.

Alternative J2H - The cutting units and roads proposed for this alternative would impact seven recorded historic sites. Five of these are trails that require marking and clearing of the original routes following harvest. The remaining two would require boundary adjustments on two units to avoid impacting the sites. One of these is a National Register site.

Cutting units 1, 1A, 10, 12, and 147 are located in areas that have recently been identified as having high potential for prehistoric sites.

Alternative K - The cutting units and roads proposed for this alternative would impact five recorded historic sites. These are all trails that require marking and clearing of the original routes following harvset. As compared to Alternative J2H, the harvest unit boundaries have been adjusted to avoid impacting sites that have been recommended for full protection.

Cutting units 1, 10, and 12 are located in areas that have recently been identified as having high potential for prehistoric sites.

INTRODUCTION

This chapter discusses the effects of the various alternatives on air quality. The disposal of harvest residues is the main air quality effect of implementing any action alternative. Various burning treatments and the effects of burning on air quality are reviewed. Common effects and mitigation for all the action alternatives are then discussed.

The effects to air quality are compared for each alternative based on the amount of acres of prescribed burning. At the end of this section, a summary of planned debris disposal acreages is displayed. A discussion of Consistency with the Forest Plan completes the Air Quality section.

Types of Burning

There are many situations in forest management where it is desirable, if not necessary, to dispose of the large volumes of forest harvest residues produced by logging (Jemison, 1974). Sometimes the accumulation of harvest residues is so great that it impedes the establishment of natural regeneration. Or it can make an area unplantable because of the thick layer of needles, branches, and other woody debris on the ground. The heavy fuels created by logging also increases the risk of a wildfire. Applied under carefully pre-selected conditions, prescribed fire, an adaptation of natural fire, is used as a tool to reduce these heavy fuels (Cramer, 1974). Prescribed fire has been used to accomplish land management objectives in the West for many decades (DeByle, 1981).

All action alternatives would require burning of harvest residues, and thereby would affect air quality by generating smoke. Differences among the action alternatives are related to the types and acres of fuel treatment. The effects of the alternatives will be assessed on the basis of acres of broadcast burning, acres of underburning and acres of pile/landing burning. Table 4-29, Summary of Planned Debris Disposal Acreages, displays the acres of these treatments by alternative.

For all action alternatives, underburning would be used as a fuel treatment in several of the proposed seed tree and shelterwood harvest units. The objective of underburning would be to reduce the fuel loading while protecting the residual overstory trees. To protect the overstory trees, slow burning techniques are used. Underburning therefore is likely to burn with inefficient combustion, which creates more smoke than efficient combustion (Cramer, 1974). Therefore, underburning would contribute more smoke management problems than would broadcast burning or pile/landing burning.

Broadcast burning normally causes less smoke management concerns than underburning. Because of the more efficient combustion associated with these burning techniques, a convective column is formed and lifts a majority of the smoke above the mixing air layer. Therefore, a given acreage of broadcast burning would put less smoke into the airshed than the same acreage of underburning.

Pile/landing burning has the least effect on air quality. Bonners Ferry District piles as much logging debris as it can, while meeting other management objectives, in order to take advantage of this method of smoke management. Piles are burned in the late fall when there is little competition for space in the airshed. Moreover, quick removal of smoke from the air can be accomplished by burning piles at such a time as to send the smoke into a precipitating raincloud (Cramer, 1974).

Effects of Burning

Since 1972, the Environmental Protection Agency (EPA) has issued National Ambient Air Quality Standards for seven pollutants: sulfur dioxide, carbon monoxide, total suspended particulates, ozone, hydrocarbons, nitrogen dioxide and lead (Bergoffen, 1981).

Sandberg and others (1979) reviewed the products of combustion produced from the burning of forest fuels. Their report on the pollutants listed above states:

1. Sulfur dioxide. Most forest fuels contain less than 0.2% sulfur. Therefore, sulfur oxides are produced only in negligible quantities by forest burning.
2. Carbon monoxide. Concentrations are high near the fire but drop off very rapidly within 100 feet.

3. Hydrocarbons. Literally hundreds of organic gases and vapors containing hydrocarbons are released in forest fire emissions. In the hydrocarbon class, gaseous elements consist primarily of methane, ethylene, acetylene and several hundred organic classes (i.e. organic acids, aldehydes, and furnans). Many higher molecular weight aliphatic, andaromatic hydrocarbons are emitted. Benzo(a)pyrene also has been found in wood smoke.
4. Nitrogen dioxide. Fixation of nitrogen into oxides occurs at temperatures higher than are normally reached in prescribed fires.
5. Lead. Not mentioned as an emission.

Low intensity fires, heading fires which are burning large areas at one time, and non-woody fuels produce the greatest yields of carbon monoxide, hydrocarbons, and particulates. The major impacts on air quality come from minor and trace components categorized as hydrocarbons and particulates. Water vapor and carbon dioxide compose over 90 percent of the products of burning.

Probably the most important single category of emissions is particulates. They are the major cause of reduced visibility. Forest smoke particulate matter has a very high organic character. Most particles are near 0.1 micrometer in diameter (Sandberg, et al, 1979). Particulates may aggravate respiratory conditions in susceptible individuals, especially in combination with sulfur oxides (Sandberg, et al, 1979). Because sulfur oxides are a very minor emission from burning forest fuels, the particulate would have to mix with emissions from other sources to increase aggravation to humans.

Sandberg also displayed estimates of annual particulate production in the Rocky Mountains and compared particulate production of prescribed fires with wildfires. His table shows 105,000 tons of particulates are produced annually from prescribed fire and 850,000 tons from wildfire. Prescribed fires therefore generate 13 percent of the particulates produced by the burning of forest fuels compared to 87 percent for wildfires.

Effects Common to All Action Alternatives

Dust and Exhaust

Dust and exhaust from vehicles during road construction and timber harvest operations would contribute short-term effects to air quality. Effects would be localized to the immediate vicinity of these operations. To mitigate the amount of dust on roads used for timber-hauling, the timber purchaser would be required to water or otherwise treat roads during extended periods of dry weather.

Smoke

For all action alternatives, smoke generated in this area would primarily affect the air quality in Boundary County, Idaho; northwestern Montana; southeastern British Columbia; and southern Alberta. Potential also exists for smoke to drift into the Cabinet Mountain Wilderness Area, a Class I airshed, located to the southeast of the Decision Area. Long-term weather records at the Priest River Experimental Forest indicate the winds have a prevailing direction from the southwest during all or most of the year (Finklin, 1983). These prevailing winds therefore would cause smoke normally to drift north of this wilderness area.

To mitigate the effect to air quality, all planned ignitions for post-sale site preparation/fuel reduction treatments would be conducted according to guidelines of the Montana Smoke Management Memorandum of Agreement and Idaho Air Quality Implementation Plan. The Environmental Protection Agency (EPA) has approved these plans as meeting the requirements of the Clean Air Act as amended in 1987. These plans regulate the amount of forestry-related burning which can be done at any one time. The amount of burning that can occur on any given day depends upon the specific type of burning, the tons of material to be burned, and atmospheric conditions available to promote mixing and transport of smoke away from sensitive areas.

For each project, the Forest Service would require an approved site-specific prescribed burn plan to ensure that resource management objectives are clearly defined and that the site and environment are not harmed. By specifying the timing and conditions of burning, peak loads of smoke in the

airshed can be reduced and the possibility of smoke affecting sensitive areas can be minimized. The burn plan also would complete a risk assessment to estimate the chance of a fire escaping and would develop a contingency plan for preventing as well as quickly containing any burns that do escape.

Prior to initiating burning on the Bonners Ferry Ranger District on any given day, the District Burn Manager determines if there are any restrictions to burning from either the State of Montana or Idaho. The burning plan is initiated only if there are no air quality restrictions in effect.

The Bonners Ferry Ranger District routinely follows procedures to reduce the amount of smoke that accumulates in the environment. Each unit that is planned to be burned is visited immediately following harvest to determine if burning is needed to meet the silvicultural and fuel management objectives of the stand. If burning is not needed, the burning plan is not activated. Every year, a number of units are determined as not needing burning.

One goal of the Bonners Ferry Ranger District is to broadcast burn and underburn in the spring. Several reasons favor spring burning. Most importantly, there are fewer air quality concerns during this season than in the summer or fall. However, not all broadcast and underburning can be accomplished in the spring. In some years, weather conditions are unfavorable for completing all the desired acres of spring burning. And for some units, the site conditions are such that the burning window (i.e. a prescribed set of burning conditions) is only open during the fall months.

Wildfire

Any type of human activity increases the possibility of wildfire ignition. Because of the heavy fuels and increased probability of ignition by logging equipment, smoking, arson, and other factors, all action alternatives would multiply the risks of a wildfire being started. A wildfire would contribute enough smoke to diminish the air quality, and therefore would be responsible for a shut-down of other activities that would add to reduced air quality.

For all action alternatives, the timber purchaser would be required to have fire equipment and to take necessary fire precautions to prevent a wildfire from occurring. In the event of extreme fire conditions, the harvest activities would be regulated or even suspended until fire conditions improve. The timber sale administrator closely monitors the fire prevention requirements of the timber contract through the life of the harvest operation.

EFFECTS BY ALTERNATIVE

Alternative A

This alternative is a decision to not implement timber harvest or road construction. Therefore, there would be no direct effects to air quality.

As discussed in Vegetation in Chapter 3, pine stands in the Decision Area have a high potential for mortality because of a potential mountain pine beetle epidemic and white pine blister rust. Fuels would accumulate in these stands especially as the mountain pine beetle infestation grows. This buildup of fuels creates an ideal setting for a large wildfire to occur, potentially generating smoke to an extent that air quality degradation would occur for several days at a minimum. The action alternatives all would treat a portion of these high risk stands, and remove the potential high fuel loadings caused by this mortality.

Alternative B2

As shown on the accompanying chart, Alternative B2 would generate the largest total acreage of planned burning. The largest number of acres of broadcast burning, 395; the third largest acreage of underburning, 200; and the sixth largest acreage of pile/landing burning, 1695. Because of the high amount of acres of broadcast burning and underburning--595 acres, Alternative B2 would generate the largest amount of smoke. As with the other action alternatives, the effects to air quality would be mitigated as discussed in Effects Common to All Action Alternatives.

TABLE 4-29

Summary of Planned Debris Disposal Acreages

Disposal Method	B2	D	E	EH	H	I	J1	J2	J2H	K
Broadcast Burning	395	0	0	0	45	85	0	45	45	0
Underburning	200	40	40	40	125	70	202	217	217	0
Grapple Pile Burning	405	65	125	245	413	210	258	338	338	344
Yard Tops, Pile & Burn Landings	1290	1840	825	995	1112	740	1087	1167	1167	1679

Alternative D

This alternative has no broadcast burning; the smallest acreage of underburning, 40; and the second largest acreage of pile/landing burning, 1905. The third largest total acreage of planned burning, 1945 acres, would be completed in Alternative D. However, because nearly all of the acreage is in pile/landing burning which has the least effect on air quality, Alternative D would have little effect on air quality.

Alternative E

Alternative E would have the lowest total acreage of planned burning, 990 acres. No broadcast burning; the smallest acreage of underburning, 40; and the second smallest acreage of pile/landing burning, 825, would be included. Because only 40 acres of underburning would be included with the remainder being pile/landing burning, Alternative E would have the least effect of the action alternatives on air quality.

Alternative EH

Alternative EH would be similar to Alternative E in effects to air quality. No broadcast burning; 40 acres of underburning; and the second lowest acreage of pile/burning, 1240, would be included. As with Alternative E, this alternative would not have a large effect on air quality because of the small acreage of underburning.

Alternative H

This alternative would include the second lowest number of acres of broadcast burning, 45; the fourth largest acreage of underburning, 125; and the fifth largest acreage of pile/landing burning, 1525. Therefore, Alternative H would contain the fifth largest acreage of prescribed burning, 1695 acres. The combined 170 acres of broadcast and underburning would create a moderate amount of smoke, but would be mitigated as discussed in Effects Common to All Action Alternatives.

Alternative I

Alternative I would involve the second highest number of acres of broadcast burning, 85; the second lowest acreage of underburning, 70; and the lowest acreage of pile/landing burning, 950. The second lowest total acreage of prescribed burning, 1105 acres, would be planned in this alternative.

Alternative J1

No acres of broadcast burning; the second highest acreage of underburning, 202; and the third lowest

acreage of pile/landing burning, 1345, would be planned in this alternative. It would have the fourth highest total acreage of planned burning, 1547 acres. The 202 acres of underburning would create a moderately high amount of smoke.

Alternative J2

This alternative would include the second lowest acreage of broadcast burning, 45; the highest acreage of underburning, 217; and the fourth lowest acreage of pile/landing burning, 1505. The sixth lowest total acreage of planned burning, 1767 acres, would be executed in this alternative. With the highest acreage of underburning, however, Alternative J2 would produce a moderately high amount of smoke.

Alternative J2H

No difference in prescribed burning acreage from Alternative J2 would occur in Alternative J2H. The additional harvest acres proposed in this alternative would not require fuel treatment. Therefore, the effects to air quality of Alternative J2H would be similar to those of Alternative J2.

Alternative K

This alternative has no broadcast burning or underburning, but has the largest acreage of pile/landing burning, 2023. The second largest total acreage of planned burning, 2023 acres, would be completed in Alternative K. However, because all of the acreage is in pile/landing burning, which has the least effect on air quality, Alternative K would have little effect on air quality.

Consistency With the Forest Plan

All alternatives would comply with the direction of Forest Plan standards and guidelines to mitigate the effects to air quality. Smoke management guidelines as specified in the Montana Smoke Management Memorandum of Agreement of 1978 and the Memorandum of Understanding with the State of Idaho of 1988 would be followed.

INTRODUCTION

Maintaining soil productivity is integral to maintaining the long-term productivity of the forest ecosystem. Soil productivity is the inherent capacity of a soil to support the growth of plants (USDA Forest Service, 1987b). Soils are affected by forest management; primarily by harvesting and road building. Minimizing soil surface disturbances from harvesting requires considering the effects of the type of logging system and the method of brush disposal, as well as limitations imposed by the soil itself. Impacts from harvesting include compaction, displacement, erosion, and loss of nutrients. Impacts from road building are similar; one difference is the permanent loss of land to crop productivity, thus erosional impacts are the major concern.

Tractor, skyline, and helicopter logging systems were all considered. Tractor skidding was designed to avoid geologically unstable, saturated, or easily compacted soils. The impact of tractor skidding would be further lessened by winter logging over packed snow and with the use of soft track skidders. Designated skid trails are used to minimize the extent of area subject to compaction and displacement. Limiting the number of passes made on individual skid trails has been found to be ineffective in reducing compaction because most of the compaction occurs in the first few passes. (Harvey, et.al, 1989)

Skyline systems would be used where it was determined that tractor skidding was not appropriate and where skyline yarding would not result in more soil disturbance through road construction than would be caused by tractor skidding. Skid roads are not used; compaction and displacement are much less. Helicopter systems are used where access by road is not feasible. Soil impact should be negligible, although removal of timber from oversteepened slopes could result in mass movement several years later (USDA Forest Service, 1977).

Brush disposal methods considered are grapple piling, burning, and yarding tops. Brush disposal is necessary to reduce the potential of severe wildfire, but care must be taken to maintain soil productivity by leaving sufficient large woody debris and limiting soil surface disturbances. Slash serves many beneficial purposes. As well as moderating soil surface temperatures, woody residue serves as a store of nitrogen and other nutrients. Decomposing woody residue provides the energy for nonsymbiotic nitrogen-fixing bacteria. Where symbiotic nitrogen-fixing plants are absent, this becomes a major nitrogen source.

Rotting wood also provides the energy for ectomycorrhizae fungi. These fungi cause distinctive short roots and improve the ability of tree root systems to extract water and nutrients, especially nitrogen and phosphorus, from the soil (Harvey et al, 1987). Unless there is a specific need for sanitation to remove disease or pests, it is important to retain some slash.

Machine piling concentrates slash prior to burning. Piles and windrows should be kept small and well scattered to break up large-fuel continuity; plenty of large slash should be left between the rows (Harvey et al, 1989). There is a high risk of compaction and displacement with the use of dozers, but recent grapple piling has shown a much smaller impact (Ford, 1991).

Burning, which includes broadcast and underburns, can also be used to eliminate excess slash. Burning can be used where slopes are too steep and soils too wet for dozer piling. However, weather constraints may be limiting and personnel costs are high. A light burn over moist soil will result in minimal damage. Some nutrients will be volatized and lost, some will be mineralized and become available for plant growth but also subject to loss by leaching. In certain circumstances, severe fire may render soil layers beneath the surface nonwettable (USDA Forest Service, 1977). Burning may be chosen for ecological reasons, favoring fire-tolerant species.

Yarding tops involves removing the entire tree in the skidding process. While this procedure is used primarily with thinning and other low-intensity cuts, the hazard exists for the depletion of large woody debris.

Road building inevitably disturbs soil productivity. Roads on gentle to moderate slopes in stable topography can pose few problems. But all roads, even temporary ones, can cause severe impacts of compaction, displacement, and erosion. Erosion

can be controlled to reduce sediment entering stream courses. Sources of this sediment are from direct movement of soil during construction and maintenance, surface erosion, and mass erosion or movement (USDA Forest Service, 1977). Careful planning and mitigation can reduce these impacts.

Other soil limitations considered by mapping units may affect forest management decisions. Care must be taken where soils are judged to have moderate to severe hazard for mass failure and erosion. Other considerations include dissection, where there is a high potential for road sediment reaching streams. Reforestation is a concern where slopes are dry and/or have little forest cover, especially at higher elevations. In riparian areas, care must be taken to protect water quality and riparian area dependent species (Ford, 1990b).

EFFECTS COMMON TO ALL ALTERNATIVES

Pacific Gas Transmission (PGT) is studying the potential for construction of a new gas line adjacent to their existing one which follows the Moyie River. Impacts from this construction would be similar to that expected from road construction, and special care must be taken to keep sediment from reaching the river. The ditch digging could reduce the long-term productivity of the soil by displacing the nutrient-rich surface layer. An Environmental Impact Statement is being prepared for PGT by a consulting firm.

Other probable actions within the decision area include salvage harvest, overstory removal on seedtree and shelterwood harvested units, and continued limited mining exploration. No additional roads would need to be built and impacts should be minor to the harvested units.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

Based on the history of mineral exploration and mining within the Decision Area, it is reasonably foreseeable that additional mineral exploration will occur. The probability of future mineral exploration would increase as additional roads are construction within the Decision Area. This mineral exploration would likely consist of diamond drilling. There would also be some potential for minor road construction to access drill sites.

Direct effects that will result from forest management activities proposed in all action alternatives include the earlier mentioned compaction, displacement, and erosion. Long-term productivity is affected by loss of nutrients through harvesting and the road location. Compaction reduces soil permeability and infiltration, which can increase erosion and reduce plant growth. When displacement occurs, future tree growth is patchy. It may be increased where organic matter is concentrated, but reduced overall.

All action alternatives will have some form of road or trail construction. For each mile of permanent road built, it is estimated that four acres of land are taken out of production. Temporary roads will be closed and revegetated after the sale is over, as will skid trails and landings, but some loss in productivity will remain. Skid trails are estimated to occupy 10 percent of the acres tractor logged, landings 2.8 percent of the total harvested acreage.

Tractor logging is the most common logging system used in the alternatives. Yarding tops is the most common form of brush disposal, although burning and piling will occur to varying extents. Where piling is planned, it will be 100 percent grapple piled.

Some other effects common to the alternatives are indirect and cumulative ones. Indirect effects from soil compaction can increase host stress and feeder root pathogens (Harvey et al, 1989). Cumulative effects result from repeated entries, such as increased compaction and loss of nutrients.

The Forest Plan mandates that management activities will not significantly impair the long-term productivity of the soil or produce unacceptable levels of sedimentation resulting from soil erosion. Eighty percent of the activity area must be maintained in an acceptable condition. Unacceptable productivity potential exists when soil has been detrimentally compacted, displaced, puddled, or severely burned (as defined in FSH 2509.18).

Additionally, projects should strive to maintain sufficient large woody debris, essential for microor-

ganisms, to maintain site productivity. In the event of whole-tree logging, provision for maintenance of sufficient nutrient capital should be made in the project analysis.

The Soil Management Handbook (FSH 2509.18) also states that a guideline of 15 percent reduction in inherent soil productivity potential will be used as a basis for setting threshold values for measurable or observeable soil properties or conditions. Soil quality guidelines for IPNF have been developed.

Compaction is the disturbance whose threshold is most likely to be exceeded; bulk density for volcanic ash soils should not increase more than 20 percent. For residual soil material the increase should not be more than 15 percent. Other disturbances having measurable thresholds include:

- Displacement, with the removal of the forest floor and 1" or more of the surface mineral soil layer, or more than one-half of a thick organic layer.
- Puddling, with macropore space reduction of 50 percent or more.
- Severely burned, where the forest floor is consumed down to mineral soil and fine roots and organic matter are charred in the upper one-half inch of mineral soil.
- And erosion, with a soil loss tolerance of two tons per acre per year for deep soils and one ton per acre per year for shallow soils.

These threshold are designed to evaluate soil conditions within activity areas. Use of Best Management Practices (BMP) as outlined in the Soil and Water Conservation Practices Handbook (FSH 2509.22) and Rules and Regulations Pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code should allow consistency with the Forest Plan.

Monitoring results throughout the forest for the last several years have shown that the management activities which produce detrimental effects in excess of forest-wide soil standards are: dozer piling, tractor yarding using logger's choice skid trails, and burning under dry soil moisture conditions (Ford, 1990a).

Implementation monitoring will continue on all projects to ensure the use and effectiveness of soil conservation practices.

COMPARISON OF ALTERNATIVES

Alternatives will be compared by acreage of land removed from productivity by permanent roads and impacted by skid trails and landings. Types of logging systems, brush disposal and forest activities by soil limitations are also compared.

The soil limitations are based on map unit distinctions (Ford, 1990b) Riparian acreage falls within map unit 104, which includes streams and the associated riparian zone. Planned activities will be avoiding this sensitive zone, yet potential for problems still exists.

Dissected acreage is in map units 231, 263, 264, and 265, where road sediment has a high potential for reaching streams. Reforestation is a concern with map units 212, 270, 271, and 272; these units are characterized by dry aspects and open forest on ridges. Most harvesting units proposed are on east aspects and not on ridges, which should be less difficult to reforest.

Map units 222, 232, 261, 264, and 271 have a moderate hazard for mass failure and erosion potential. Map units 180, 262, 265, and 272 have a severe hazard. This is based primarily on steepness of slope. Moderate slopes are 35-55 percent, severe slopes are 55 percent and up.

Map unit 180 contains avalanche chutes. Harvesting units planned in this map unit will be mostly helicopter logged on the moderate benches between chutes.

The variation between alternatives based on soil impacts is relatively minor if Best Management Practices are followed. Alternative B2 has the greatest impact; Alternative E the least. Rather than repetitiously describe the various soil impacts, they will be listed in the following table.

Alternative A, having no planned activity other than possible salvage and overstory removal, is not included in the comparison. All figures listed are in acres. Miles of road are multiplied by four to get acreage. In considering soil limitations for harvesting, acreage is given in actual and Equivalent Clearcut Acres (ECA), as determined by the R1R4 model. These are taken from the watershed analysis and reflect the intensity of harvesting planned. These ECA figures follow the actual acreage in the table.

TABLE 4-30

COMPARISON OF ACTIVITIES AND SOIL DISTURBANCES

Activity (in Acres)	B2	D	E	EH	H	I	J1	J2	J2H	K
Permanent Roads (Mi X 4 = Ac)	82	31	-	-	48	30	29	39	39	35
Skids Trails & Landings	226	232	108	133	190	118	185	213	213	286
Logging - Tractor	1645	1780	800	1010	1431	885	1415	1635	1635	2214
Logging - Skyline	570	165	190	145	250	165	132	132	132	102
Logging - Helicopter	75	-	-	1514	-	50	-	-	1206	782
Brush Disposal:										
- Yard Tops	1290	1840	825	995	1112	740	1087	1167	1167	1781
- Burn	595	40	40	40	170	155	202	262	262	0
- Pile	405	65	125	245	413	210	258	338	338	344
Limitations to Roads										
- Riparian	8	1	-	-	8	2	8	8	8	8
- Dissection	30	18	-	-	18	11	13	17	17	16
- Moderate Erosion	20	6	-	-	6	2	4	4	4	4
- Severe Erosion	1	<1	-	-	1	1	1	1	1	1

The following acreages are given in Actual and Equivalent Clearcut Acres (Actual/ECA), as determined by the R1R4 model.

Limitations to Harvesting										
- Riparian	65/61	65/1	55/39	75/22	74/13	50/4	55/8	60/17	60/17	60/5
- Reforestation	87/84	91/3	43/40	230/33	61/58	35/33	40/38	40/38	234/59	91/28
- Moderate Erosion	409/200	381/43	155/18	899/129	214/61	32/20	213/57	244/69	955/185	825/149
- Severe Erosion	37/36	15/1	-	381/115	-	-	20/13	20/17	381/115	353/107
- Avalanche	30/30	10/1	-	105/46	-	-	20/13	20/17	105/46	100/46

Relationship Between Short-Term Use and Long-Term Productivity

Water Quality

The duration of the effects of timber management on the water resource is highly variable and dependant on land and vegetation types. Stream channel conditions may be altered as a consequence of short-term direct or indirect effects of management activities. Erosion and sedimentation from road development and increased peak flows may occur even after vegetative recovery, although at a lesser degree than initially. These water yield and sedimentation effects are long-term because they may not fully recover to natural rates.

Visual Quality

The range of visual effects generated by logging and the associated road development varies in duration and intensity according to the silvicultural system prescribed and the logging method used to accomplish it. Initially, the appearance of harvest areas would interrupt the natural appearance of the landscape. Visual quality objectives would be achieved in the long term as vegetation recovery would soften the impact of management activities.

Wildlife

Key habitat requirements for wildlife species include feeding habitat or foraging areas interspersed with nesting or denning habitat and thermal and hiding cover. As the feeding habitats experience successional changes and reforestation, they will again provide cover. The appropriate scheduling of timber harvest can provide and sustain a mosaic of cover and feeding habitat.

Vegetation

Managed stands produce a higher volume through time than unmanaged stands. Regeneration of desired fast-growing species, planting of genetically improved trees, stocking control to reduce competition and to improve growth of individual trees, and intermediate treatments to maintain the health and vigor of stands are silvicultural means of maintaining the long-term sustained yield of forest stands.

In the short term, harvesting stands at high risk to insect and disease mortality captures volume that would otherwise be lost. Timely reforestation puts the land back into productive timber-growing condition. Not harvesting these high risk stands fails to use volume that would otherwise be lost, and lengthens the amount of time before stands are returned to a productive condition for growing timber.

Air Quality

The temporary impacts of smoke from prescribed debris burning and road dust from vehicles associated with proposed activities would have minor, short-term effects on visual quality and recreation use. The short-term impacts are traded for long-term increased site productivity.

Soil Productivity

The soil resource is the key ingredient for maintaining the productive potential for the area. Because local soil types display thin accumulations of organic matter, the disturbance and/or removal of this thin layer could have a long-term impact on soil productivity.

The intensity of soil impacts would vary with the total area of timber harvest, logging system, site preparation method and slash disposal method. The IPNF maintains a strong concern for the soil resource and is committed to maintaining soil productivity.

Roads and trails are constructed and maintained to assist in the production and use of the forest resources. As roads provide continuous use over time, they are considered long-term commitments. Land that is occupied by the road prism is not suitable for timber production, and is therefore removed from the productivity base.

Irreversible and Irretrievable Commitment of Resources

An irreversible commitment of resources results from a decision to use or modify resources that are not renewable, or are renewable only over a long period of time. Where use of a renewable resource is lost due to land allocation decisions or conflicts in scheduling management activities, the commitment becomes irretrievable and the opportunities are forgone for a given time period.

Roadless Character

The decision to implement an alternative that would impact any portion of the Hellroaring roadless area would constitute an irreversible and irretrievable commitment of the roadless resource (see Chapter 4, page 4-9).

Water Quality

Impacts on the water quality conditions would vary with the level of harvest and miles of road constructed. Depending upon the alternative implemented, there may be a reduction in the water quality of drainages within the Decision Area due to increased sedimentation associated with management activities. Sediment yield increases would not recover to natural rates for a long time after roads are constructed into drainages. The result would be a decrease in fisheries habitat and increased sediment filtering by the Beeline Water Association.

Visual Quality

Irreversible changes in the natural appearance of the landscape would occur under some alternatives. These changed would become progressively less noticeable as vegetation recovered in harvested areas and along roads.

Wildlife

The loss or modification of habitat for certain wildlife species is an irreversible commitment of resources. As vegetation recovers, this habitat would recover, however the time frame for this to occur may be as long as several decades for mature and old growth related species.

Vegetation

Old growth habitat is a unique feature found throughout the Decision Area. Its distribution is limited because of past wildfire occurrence and past timber harvest practices. Harvesting of old growth timber would reduce the available old growth habitat for an extended period of time and would constitute an irreversible commitment of resources. Timber stands that have been identified as potential future old growth habitat will not achieve the characteristics of old growth habitat for approximately 70 years.

Air Quality

The impact of prescribed burning and road dust would have temporary seasonal impacts on the air quality in all alternatives except Alternative A (No Action).

Soil Productivity

Best Management Practices would be used to avoid soil productivity losses from timber harvesting and associated road/skid trail construction. Road construction for timber harvesting access is proposed in all alternatives except A and E. Because the roads would be permanent, they would constitute an irreversible commitment of a resource.

Cultural Resources

Any activity that would disturb a cultural resource is an irreversible commitment.

Unavoidable Adverse Environmental Effects

Implementation of any of the alternatives would inevitably result in some adverse environmental effects. The severity of the effects would be minimized by adhering to all of the Alternative features such as Best Management Practices. If management activities occur, however, some impacts cannot be avoided. Even the no action alternative has impacts.

Roadless - The undeveloped character and recreation opportunities of all or parts of the roadless area would be adversely impacted by all alternatives except A and E. This impact would be unavoidable if timber harvesting and road construction were to occur within the roadless area.

Water Quality - To a degree, timber management activities associated with all action alternatives have an unavoidable adverse effect on water quality. The extent and duration of the impact depends on the amount and type of activity and the mitigation measures applied to reduce impacts.

Visual Quality - The application of visual quality objectives is guided by direction from the Forest Plan. The introduction of timber harvest units and road construction would add a variety of line, form, color, and texture to the landscape. Recreation visitors and local residents would notice some disturbance to the landscape. This is an unavoidable effect of timber harvesting activities. The degree of disturbance would vary by alternative.

The No Action alternative could have unavoidable visual effects if insect and disease reached epidemic proportions. In this case, areas of dead trees would be visible on the landscape. The size of these areas and the degree of visibility would depend on the severity of the epidemic.

Wildlife - Whether the implementation of any alternative occurs or not, the loss of some thermal cover in the Decision Area will occur. With the potential for increased lodgepole pine mortality, wildlife thermal cover would be impacted as these trees naturally die and fall, or are removed in timber harvesting.

The quality of mature forest stands may be noticeably reduced in several alternatives. Mature and old growth dependent wildlife species would experience fluctuations in their populations as successional conditions change. This impact would vary with the amount and quality of habitat available.

Vegetation - Ground disturbing management activities, as well as natural events, would undoubtably alter the species composition, stand development, and succession of vegetation on the sites impacted. The degree of these impacts depends upon the type and amount of harvest proposed.

Areas not proposed for harvest, but with potential for increased mountain pine beetle activity, would probably experience adverse effects as further mortality occurs.

Cultural Resources - There is no assurance that every cultural resource site will be located in advance of all planned management activities. Some ground disturbing activity could unavoidably affect an undiscovered historic or prehistoric site. Sites discovered in this manner would be immediately protected from further disturbance. Disturbance would be mitigated according to a site-specific management plan developed for that resource.

Air Quality - Temporary seasonal impacts to air quality are unavoidable in the implementation of any of the proposed action alternatives. Prescribed fire is an integral part of site preparation for reforestation. Although difficult to quantify, temporary degradation of the air quality could occur through road construction, slash disposal/site preparation, and road dust from commercial and recreational traffic.

Potential Conflicts With Plans, Policies, and Objectives of Other Jurisdictions

This section describes potential conflicts between the proposed actions (alternatives) of the Forest Service and the plans, policies, and objectives of other federal, state, regional, and local agencies.

Water Quality

The Federal **Clean Water Act** requires federal agencies to comply with all federal, state, interstate and local authorities in the control and abatement of water pollution. These authorities include **Idaho State Water Quality Bureau** and associated **Best Management Practices, Idaho Department of Lands** and the **Idaho Forest Practices Act, Idaho Department of Fish and Game** fisheries objectives, and **Beeline Water Association.** All alternatives described in this document comply with these authorities.

Wildlife

The **Forest Service** and the **U.S. Fish and Wildlife Service** share responsibility for the recovery of threatened and endangered species on National Forest System lands. The West Moyie Decision Area is outside the recovery areas for woodland caribou, grizzly bear, gray wolf, and bald eagle; none of the alternatives would affect the habitat of these species. Therefore, no conflicts exist between proposed actions and the threatened and endangered species recovery plans of the U.S. Fish and Wildlife Service.

The **Idaho Department of Fish and Game** manages populations of elk and white-tailed deer. Its recommendations include maintaining a minimum of 50 percent habitat effectiveness for elk, maintaining a minimum cover/opening ration of 60/40 for white-tailed deer, and restricting regeneration unit sizes to 10 acres or less. Alternatives A and I meet these recommendations. Alternatives B2 and J2H do not meet the guidelines. Other alternatives partially meet the recommendations. The alternatives and their effects are discussed in more detail in chapters 2 and 4.

The **Idaho Department of Fish and Game** lists the boreal owl as a sensitive species. The Department's policy is to maintain viable populations of the species. Sufficient suitable habitat does not exist within the decision area right now to accomplish this objective. Alternatives B2, E, H, I J2, and J2H would further reduce this habitat. Effects of the different alternatives are discussed in more detail in chapters 2 and 4.

The **State of Idaho** also maintains a sensitive plants list. Site-specific plans consistent with state guidelines will be developed and implemented if sensitive plants are encountered.

Cultural Resources

Cultural resources have been inventoried in the Decision Area, and sites are known to exist. They will be avoided, protected, or mitigated in accordance with the **National Historic Preservation Act. The Kootenai Tribal Historian** will be kept informed on site information and potential impacts.

Air Quality

All alternatives would follow smoke management guidelines specified in the **Montana Smoke Management Memorandum of Agreement of 1978** and the **Memorandum of Understanding with the State of Idaho, 1988.** The **Environmental Protection Agency** has stated that these memorandums meet the **Clean Air Act** as amended in 1987.

Specifically Required Disclosures

Effects of Alternatives on Social Groups

There would be no overall differences between alternatives in effects on minorities, Native American Indians, women, or the civil liberties of any American citizen.

Effects on Floodplains and Wetlands

There are several bogs, ponds, and small lakes within the Decision Area. These wetlands would not experience any significant adverse effects from management activities. The Moyie River floodplain would not receive measurable impact by upstream influences. Management activities designed to protect these resources conform with the federal regulations for floodplains (Executive Order 11988) and wetlands (Executive Order 11990).

Energy Requirements and Conservation Potential of Alternatives

The energy required to implement the alternatives in terms of petroleum products would be insignificant, when viewed in light of the production costs and the effect of the national and worldwide petroleum reserves.

Effects of Alternatives on Prime Rangeland, Forest Land, and Farm Land

The alternatives presented are in compliance with Federal Regulations for prime land. The definition of prime forest land does not apply to lands within the National Forests. The Decision Area does not contain any prime farm lands or rangelands. In all alternatives, Federal lands would be managed with the appropriate consideration to the effects on adjacent lands.

CHAPTER 5 PUBLIC INVOLVEMENT

Introduction

This chapter includes the following sections:

1. Summary of scoping and public involvement activities prior to the Draft EIS (from Chapter II in the Draft EIS)

2. Summary of public involvement between the Draft EIS and Final EIS

3. Brief summary of the public comment on the Draft EIS

4. Copies of all letters from everyone who commented on the Draft EIS.

We have included the letters received on the Draft EIS in this chapter. Each letter is followed by our answer and information directing you to the place in the FEIS where the particular concern is addressed.

Chapters 2, 3, and 4 each have a section describing the changes made to the chapter between the draft and final editions of the EIS. In addition, each chapter has references to summarized public comment to help you understand the comment and the way it is addressed in the Final EIS.

Scoping

The scoping process was used to determine the extent of environmental analysis needed. This process began with the preparation of a position statement addressing the proposed activities. The position statement was sent to individuals and groups who have shown interest in management activities on the Bonners Ferry Ranger District and to landowners adjacent to the project area. It was also advertised in the local newspaper in February, 1985.

Public response and agency replies to this response are located in the Moyie Face EA file. Responses were received from five individuals or groups. Their concerns were categorized as follows: water quality - 3; desire to be kept informed on the decision making process - 3; access management (favored road closures) - 2; visual resources - 1; and wildlife - 1.

On March 10, 1989 a Notice Of Intent (NOI) to prepare an environmental impact statement for the proposed West Moyie Timber Sales was printed in the Federal Register. On March 14, 1989 the NOI was mailed to individuals who have shown interest in activities on the Bonners Ferry Ranger District and specifically in the Decision Area. A list of these individuals and groups is in the project file.

In summary, response was received from four individuals or groups. Concerns included: roadless issue, favored development - 1; fisheries - 1; visual resources - 1; old growth habitat - 1; and wished to be kept informed on decision-making process - 1. One response contained two subjects.

Additional concerns identified by the Forest Service include: vegetation conditions, recreation, economics, air quality, cultural resources, and soil productivity.

A post-scoping document was prepared and sent to all individuals who have shown interest in this project. This document included:

1. an explanation of issues identified through internal scoping and public participation
2. indicators proposed to measure the effects of the proposed action and alternatives on the issues, and
3. alternative descriptions as designed in response to the issues.

Individuals and groups that received this notice and their input are listed in the project file.

Several meetings with interested groups and organizations were held. Records from these meetings are located in the project file.

Public meetings to assist in the development of alternatives were held in Bonners Ferry on September 28, October 5, and November 14, 1989. The meetings were attended by citizens and representatives of groups from the environmental community, timber industry, other local industries, government agencies, and other individuals or groups who had expressed an interest in development of site specific alternatives. The goal of these meetings was to review the Decision Area and develop one or more alternatives that could be supported by

these individuals. Minutes from the meetings are on file in the project file.

Summary of Public Involvement between the Draft EIS and Final EIS.

The Draft EIS was mailed to the public on July 19, 1990. On July 20, 1990 a press conference was held in Bonners Ferry for local and regional media. The Notice of Availability appeared in the Federal Register on July 27, 1990. The Bonners Ferry Ranger District sponsored an open house in Bonners Ferry on August 1, 1990. The open house was held to meet with interested individuals to answer their questions and concerns and better enable them to comment on the Draft EIS.

To respond to the public comment on the DEIS, we developed the following alternatives:

Alternative EH. This alternative was proposed by a group of local residents from the Moyie River and Round Prairie area. The purpose of this alternative is to:

1. Reduce impacts from road construction associated with the proposed action,

2. Reduce long term risks from insects and disease, and

3. Provide a reasonable amount of timber for the local mills and the subservient economy.

Based on these reasons, the following combination was proposed as a new alternative:

(a) Alternative E, plus

(b) The helicopter option as described in alternative J2H, plus

(c) Adding to the helicopter option (i.e. harvest by helicopter or by other system that does not require road construction), all those stands from J1 which are high risk stands and all those stands whose proposed harvest methods leave at least 50% of the existing trees.

Alternative K. This alternative was developed in response to public comment on the Draft EIS. Primary comments which drove the development of this alternaive were:

1. visual quality

2. water quality

3. timber supply for area mills

4. mountain pine beetle infestation risk

5. wildlife habitat, primarily goshawk, boreal owl, and winter range.

Brief Summary of the Public Comment on the Draft EIS

Public comment is summarized briefly in this section. All of the comments received are not included in the following summary. To understand the diversity and complexity of the public comment we encourage you to review the letters incorporated into this chapter. Comments are organized here by issue. The comments which could not be easily categorized this way are summarized in the following General section and again at the end of this section.

General

A total of 22 written comments were received. Eight were from persons with no apparent organizational or corporate affiliation, including one petition with 86 signatures. Eight comments were received from organizations or corporations. Six agency comments were received, including: the Environmental Protection Agency (EPA), U. S. Geological Survey (USGS), USDA Soil Conservation Service, US Dept of Interior, Idaho Dept. of Fish and Game, and Idaho State Department of Health and Welfare Division of Environmental Quality Water Quality Bureau.

One respondent requested an extension of 45 days to the comment period, this request was denied.

Comments on the general quality of the DEIS ranged from: "you have done a very good job on

this Draft EIS", to; "This EIS plans extensive logging in a potential wilderness without fully disclosing the likely impacts, a revised Draft EIS is needed to cure these problems".

Some comments reflected a lack of acceptance of Forest Plan decisions and seemed to express a desire to revise those decisions. Others reflected a lack of understanding of the U.S. Forest Service two-stage planning process.

Issue 1 Roadless

Of the seven letters received commenting on the issue of entering the Hellroaring roadless area, three opposed any new entry. The remainder requested a more complete analysis and disclosure of the effects of such an action. Requests included such items as: long term effects to wildlife from eliminating the roadless area; cumulative effects to district wide roadless resource; Consider a wilderness recommendation alternative; provide an alternative that would harvest the forest plan ground truth volume from the roaded base, and; provide a full economic analysis for development of the roadless area, including the value of all timber within the roadless area and values of other resources.

Issue 2 Water Quality

Five letters were received from organizations or corporations that commented on water quality and two from agencies. The commenters' greatest concern was cumulative effects to the Moyie River and the Kootenai River from management activities within the Moyie River drainage, including Canada. These same commenters questioned the computer models that were used to demonstrate the effects the alternatives would have on water quality and pointed out that we never really addressed what would happen to stream conditions or the condition of the fisheries in the area. Two of these commenters pointed out that we never addressed the two public water systems that draw water directly from the Moyie River below the Moyie Springs Dam. Other comments received include: What was the rationale for the forest hydrologists professional judgement concerning Hellroaring Creek; As part of a comprehensive fisheries rehabilitation program for the Moyie River, further timber harvesting should be deferred untill the damaged watersheds are allowed to recover; it appears that Forest Plan sediment levels will be exceeded; and contradictions between the text of the DEIS and the forest hydrologists report included in Appendix C.

The Idaho State Water Quality Bureau requested more specific information about site specific Best Management Practices (BMP's) and how Forest Service Soil and Water Conservation Practices provide for implementation of the BMP's. The water quality bureau also requested that we identify beneficial downstream uses for each stream within the Decision Area. They also requested that we identify if any outstanding resource waters or stream segements of concern are included within the area. The EPA requested more detailed information about monitoring the effects of the project on water quality due to the potential for adverse effects to water quality and fisheries habitat.

Issue 3 Visual Quality

Most of the comments on visual quality focused on opposition to clearcutting, and the unsightly results of this harvest method. Four comments addressed the high recreation use on the Moyie River, primarily rafting, and requested that we address the visual concerns of recreationists using the river.

Issue 4 Wildlife

Two letters were received that contained comments on sensitive species (boreal owls and goshawks). Some of the concerns include: boreal owl, we are further reducing the nesting habitat below acceptable levels; goshawk, all alternatives would reduce habitat below minimum levels, a cumulative analysis including activities on adjacent private lands would show that it would be unlikely that the area could support two nesting pair.

One comment was received on pine marten; this commenter stated that as a direct result of habitat loss the pine marten in the Decision Area has become isolated preventing biological diversity and dispersal.

Three comments were received on winter range. The concerns included the lack of cover in the winter range, and amount of disturbance due to the amount of roads. One commenter stated that the north and east facing mountain sides of this area could never be made high quality winter range for deer; these are the areas ungulates migrate from not to in the winter.

One comment was received on elk, this commenter pointed out that we incorrectly applied the elk habitat effectiveness model and was overstating the effectiveness of road closures.

Issue 5 Vegetation

One comment was received on old growth, the respondant was against harvesting of any old growth. One comment was received on suitability of land for timber harvest. The respondant stated that there was no evidence in the DEIS that a serious, site-specific look was made during this planning to see if the lands to be logged were really suitable.

Another commenter stated that we did not address the question of non-declining yield.

Other Concerns

Trails

Four letters were received that commented on the disturbance to the trail system in the Decision Area that would result from the preferred alternatives. These commenters did not favor the additional disturbance to the trail system.

Roads

Three letters were received that addressed the Meadow Creek road in respect to logging traffic versus dust control and safety. Another respondant commented on the need for dust control on forest service roads in the vicinity of residences. One comment was received on the lack of documentation of the transportation planning and road management.

Alternatives

Six comments were received that supported one or more alternatives over others. Of these comments, one proposed a new alternative discussed earlier. One commenter supported alternative A to protect water quality, fishery habitat, scenic qualities, and roadless recreation values. One commenter supported eather alternative D or E, to maintain roadless values. Another commenter supported alternative E to maintain roadless recreation values, water quality, and protect cultural resources. One commenter supported the preferred alternatives J1 and J2, while another supported alternative J2H.

Issues Not Addressed In Detail

Meadow Creek Road Maintenance/Safety

Concern over impacts to this road by increased logging traffic was raised at several public meetings. The concern was for dust from log hauling and maintaining the roadbed condition. In addition, three respondents to the Draft EIS commented on the Meadow Creek Road (No. 229). They were concerned with logging traffic and associated dust and safety hazards to other users. These respondents stated that care should be taken to protect the roads, local land owners, and other users of the roads. One respondent stated that recreation use and logging traffic are not compatible due to safety reasons.

In considering these comments, the ID Team considered options that could be incorporated into the timber sales to address these concerns. The options were:

- The Forest Service would take over the maintenance of the roads

- The Forest Service and Boundary County would develop an agreement for both agencies to perform road maintenance based on proportionate use. This agreement is commonly called a Schedule A agreement.

The ID Team decided that neither one of these options was desirable for the following reasons:

1. The roads in question are presently county owned and maintained roads. They form an important loop access system for residents of Boundary County for access to their property as well as the Moyie River and the National Forest. Maintaining this access is a function of local government, not federal agencies.

2. The USDA Forest Service pays the counties 25 percent of timber and other revenues generated by the National Forest land within the county. These funds are used for education and road maintenance. In Boundary County, 70 percent of these funds are marked for the county road maintenance department. This is normally ample funding to enable the county to perform any additional road maintenance that would be due to increased logging traffic. Boundary County will be expected to perform any extra road maintenance that would be required due to logging traffic.

3. These roads are two-lane county roads suitable for mixed traffic. All drivers are required to drive in a safe and prudent manner. Instances of unsafe driving should be reported to county law officials for follow-up action. It is beyond the authority of the Forest Service to enforce county laws on county roads.

Chipping and Mulching of Logging Slash

To maintain air quality within the West Moyie decision area, one respondent suggested that any logging should be followed by mulching or shredding (i.e. chipping) of all the slash piles instead of using burning as a fuel reduction method.

Several studies have evaluated the feasibility of chipping logging residues. While chipping and respreading of the chips as a protective mulch may be an effective means to reduce the amount of slash burning, this method of treating logging residue has several disadvantages. Because of high costs, lack of equipment to handle large-sized material, and the great volumes of logging slash typical on most harvest areas, the practice never has been widely used. It has been applied to cleanup in recreation areas and along visually important roads (Jemison and Lowden, p. A-11).

One of the major effects of chipping/mulching is the obstruction of tree seeding and planting efforts. A study in western Wyoming documented that the establishment and growth of both planted and natural regeneration were limited in areas where chipping and mulching were used (Schmidt and Lotan, p. 284). Chipped slash from an average logging operation in the Pacific Northwest may cover the soil surface up to five to eight inches deep (Edgren and Stein, p. M-7).

Such a thick layer of chips would prevent the roots of seedlings from reaching mineral soil. If chips and intermingled airspaces are large, seedlings also would dry out completely. Benson (p.23) and others have documented that the height growth of trees was twice as great on broadcast burn or pile/burn areas as on the chip-spread treatment.

The microclimate of the soil also is altered by a chipping/spreading treatment. Soils under a chipping/mulching operation were found to be 5 to 20 degrees cooler than exposed soils in a Wyoming study (Schmidt and Lotan, p. 282). Cool soil temperatures inhibit plant-water uptake, slow nutrient release and absorption, and retard top growth of plants. DeByle (p. 154) and others also have concluded that chip mulch may contribute enough toxic phenols during the first two years following treatment to be of concern to fishery habitats and domestic water supplies if large areas of a watershed were mulched with a thick layer of wood chips.

In addition to the above discussion, Benson found that understory vegetation is virtually absent the first five years following treatment and, therefore, a major impact to wildlife habitat; this effect may remain for two or more decades.

Because of the potential harmful effects of chipping/mulching, as discussed above, this method of residue treatment was not included with any of the alternatives.

Non-declining Yield

One respondent stated that we did not address non-declining yield in the DEIS and that the harvest levels of the prefered alternatives seemed to be set at an unsustainably high level.

The harvest levels proposed for all alternatives in the West Moyie EIS are consistent with the FEIS for the Forest Plan of the Idaho Panhandle National Forests. This latter document established harvest levels based on Forest wide non-declining yield (see Section II-16). 36 CFR 219.16 addresses non-declining yield. This requirement is appropriately analyzed and monitored at the forest planning level. It is not appropriate to apply this to the specific project level. Therefore, it is not within the scope of this analysis to re-address the question of non-declining yield.

Achieve Timber Target From Roaded Lands

One respondent to the DEIS stated that we failed to discuss an alternative that the agency's timber targets in the Forest Plan for the Bonners Ferry Ranger District could be met without entering the roadless area.

Alternative E in the West Moyie DEIS shows the amount of timber harvest that could be derived from the roaded portion of the area. This alternative does not create enough volume to meet the West Moyie's share of the Forest Plan volume.

The Forest plan examined an alternative that only harvested timber from roaded base (alt 3) and another that recommended 75 percent of the roadless acres as wilderness. These alts were not chosen for a number of reasons described in the Forest Plan Record of Decision, such as economics and the effects on other resource objectives including wildlife habitat. In his recent decision on the ICL v Mumma case, Judge Lovell found economic analysis that led to the IPNF Forest Plan decision on roadless areas to be adequate (See United States District Court, Missoula Division, District of Montana Judgment in a Civil Case, Case Number CV-88-197-M CCL, August 8, 1990, page 12).

Net Public Benefits

One respondent to the DEIS stated that we are required by law to maximize net public benefits during planning. While there is lots of evidence that private benefits will be enhanced, there is no evidence of how the public will benefit. In Fact, it looks like the public will loose. Elk habitat potential will decline, a significant loss to the already small trail system will occur, and water quality will decline. How were these clear public losses qualtified?

The Forest Plan demonstrates how the Forest intends to maximize net public benefit. Maximizing Net Public Benefit, as described in 36 CFR 219.1(a), pertains to forest level planning. There is no requirement to re-examine net public benefit at the project level as the project would implement the Forest Plan.

Prepare Separate Environmental Assessment for Each Sale

One respondent to the DEIS requested that we prepare a separate Environmental Assessment (EA) for each of the proposed sale.

An EIS was used to disclose impacts of the proposed action because it was determined that the proposed timber sales would have a significant cumulative and similar impact on roadless values in the Hellroaring Roadless Area 1-128.

Final outcome of the EIS process will be to release a Record of Decision (ROD) concerning the proposed action and alternatives. Included in the ROD, the officer responsible for the decision will idententify the selected alternative and reasons for this selection. The decision will be site specific and will identify all actions that will be included in the project. To follow this with an EA would serve no useful purpose. All of the analysis, documentation, and decisions are included in the EIS and ROD. An EA and Decision Notice (DN) would only include the same information included in the EIS and ROD. The decision documented in a ROD could not be changed with and EA and DN.

Access

The issue of access was raised by several individuals and organizations during the scoping process. Each time the concern was raised it centered on the additional access that would result from road construction associated with the proposed action and alternatives. All individuals that raised this issue favored closing all new roads constructed. At a minimum all alternatives close all newly constructed roads. Therefore, this issue is resolved and needs no further consideration.

Caves

Recent legislation requires that caves be provided protection when considering management activities on federal lands. There are several mining addits within the Decision Area, but no locations of natural caves have been identified. The proposed action and alternatives have been field checked for feasibility, no caves were located during this process.

Range

Effects on an existing range allotment, in the vicinity of Sinclair lake, has been considered. The proposed action and alternatives are not expected to impact the condition of the meadow covered with this allotment.

Economics

Public input received in response to the post scoping document discussed under Chapter 2 scoping (page 2-2) requested that the Forest Service answer the following questions:

What percentage of the money from public timber stays locally and how much goes to corporate headquarters and stockholders?

What percent of the local timber industries volume came from public lands ten, twenty, and thirty years ago?

National and international corporations do make profits from operations conducted within Boundary County. Profits from these operations are removed from the county to finance other corporate operations and help support payments to stockholders or other investors. While this is a true statement, this EIS it is not being developed to document the corporate structure of American businesses. This site specific EIS is being developed to address the site specific effects of the proposed action. This issue is outside the scope of this EIS.

What percent of the local timber industries volume came from public lands ten, twenty, and thirty years ago? The IPNF Forest Plan (Effects of Timber Supply on Boundary County) disclosed the county's dependence on National Forest timber supply. The source of previous decades timber supply have no influence over this EIS. In addition, records for the time period prior to the Forest Service consolidation in 1973 are incomplete.

List of respondents to the Draft EIS

Draft EIS Comment List

1. Anne Kinnaman - 7/30/90

2. Les & Beth Butters - 7/26/90

3. US Geological Survey - 8/14/90 (No Comment)

4. Barbara Block - 8/20/90

5. John Osborn, MD/Inland Empire Public Lands Council - 8/27/90

6. Charles S. Polityka/US Deptartment of Interior - 8/27/90 (No Comment)

7. Howard Monks, Dr. Richard P. Luedtke, Wayne A. Fox/North Moyie River&Round Prairie Residents - 8/28/90

8. Roberta Miller - 9/5/90

9. Hollice J. & Dorothy Smith - 9/4/90

10. Al E. Murrey, P.E./Idaho Water Quality Bureau - 8/15/90

11. Charles Sheroke - 9/7/90

12. Paul H. Chaverley/USDA Soil Conservation Service - 9/5/90

13. Richard A. Villelli/Villelli Enterprises - 9/5&6/90

14. Micheal J. Bergeron - 9/5/90

15. Dave Bodner/Boundary Backpackers - 9/10/90

16. Dennis W. Baird/Idaho Environmental Council - 9/6/90

17. Barry Rosenberg/Inland Empire Public Lands Council, Forest Watch Program - 9/6/90

18. Peter Grubb/River Odysseys West - 9/6/90

19. David B. Siebanthaler/North Idaho Audubon Society - 9/10/90

20. Ken Carter/W-I Forest Products, L.P. - 9/12/90

21. David W. Ortmann/Idaho Dept. of Fish and Game - Letter of 9/10/90 replaced with letter of 1/11/91.

22. Ronald A. Lee/Environmental Protection Agency - 9/11/90

REC'D ...
AUG 2 1990

July 30, 1990

USDA: Forest Service
Idaho Panhandle N.F.
Bonners Ferry Ranger Dist.
District Ranger: Gary N. Rahm.
Rt 4 Box 4860
Bonners Ferry ID 83805

Dear Mr. Rahm:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement for the West Moyie Timber Sale Area. I feel that as the valleys of western Oregon and Washington become more heavily populated, the mountains of the Idaho Panhandle increase in importance as recreational area for activities that require a degree of solitude increasingly rare in the Cascade Range forests.

My prefered alternative is alternative E. both of the J alternatives have an unacceptable impact on existing trail systems. I object strongly to timber harvest activities which preclude the retention of enough acreage in the Hell Roaring Wilderness Study Area to allow it to be declared a wilderness Area. A

Much of the roadless area is covered with soils that are thin, young, and fragile. The potential for erosion is severe, especially when roaded. Retention as an unroaded wilderness area of no less than 5000 acres will best protect this fragile area and the purity of the waters which flow from it. B

Clearcutting should be abandoned as a preventive prescription for insect infestation and disease. More appropriate harvest methods are available and would preserve these sensitive ecosystems. C

Your draft does not address the question of non-declining yield. It seems to me that timber harvest levels in both of the J alternatives are set at an unsustainably high level. Timber harvest levels should be instituted now at levels that are permanently sustainable. The economic facts of life will be no easier to face if we put it off. D

The draft also seems to deal too lightly with cultural resources. Cultural Resource Inventories seem to be sketchy and incomplete. E

It seems to me that protecting the existing trail system will accomplish several desirable goals simultaneously. Protecting the trail system will protect most cultural resources. Fragile soils will be protected from erosion and resultant damage to water supplies and fisheries. Both water supplies and fisheries represent investment of considerable public funds.
I look forward to seeing your final Environmental Impact Statement.
Sincerely,

Anne Kinnaman

Anne Kinnaman
14582 SE Anna Marie Ct.
Milwaukie Oregon 97267

ANNE KINNAMAN

A An alternative discussing **Wilderness designation** for the Hellroaring Roadless Area is located in Chapter 2, page 2-38.

B **Soil survey and classification and impacts to soil productivity** are discussed in Chapter 3 page 3-88, and Chapter 4 pages 4-184 through 4-187. **Water quality** effects are disclosed in Chapter 2 pages 2-45 thru 2-47, Chapter 4 pages 4-24 thru 4-67, and the entire Appendix C.

C **Silvicultural systems to treat risk of mountain pine beetle** infestation are discussed in Chapter 3 page 3-71. **Amount of clearcutting and change in risk of insect infestation** are shown in comparative form by alternative in Chapter 2 page 2-48.

D **Non-declining yield** is discussed in Chapter 5 page 5-6.

E **Cultural resources** are addressed in Chapter 2 pages 2-10 and 2-37, Chapter 3 page 3-82, and Chapter 4 pages 4-176 thru 4-178.

RD

JUL 26 1990

Les & Beth Butters
HCR 61 Box 160
Bonners Ferry
Idaho 83805

Dear Sirs,
R.E. DEIS West Moyie

We support alternatives D & E of this plan, We do not feel the Roadless status of the Hell Roaring drainage should be further eroded as this area which is in full view from our property has been heavily logged around its parameteres to a very alarming degree the last few years. **A**

We also believe old Growth timber should be untouched with special emphises given to low elevation old Growth which is near non exhistant and likely occures in this drainage. **B** The idea that the east and north facing mountain sides of this area can be made high quality winter Range for deer is rediculous. **C**

LES & BETH BUTTERS

A An alternative discussing **Wilderness designation** for the Hellroaring Roadless Area is located in Chapter 2, page 38.

B The amounts of **old-growth and potential old-growth recruitment forest** that would be harvested are identified by alternative in Chapter 2, Description of Alternatives, pages 2-11 thru 2-34; and the Comparison of Alternatives Table 2-9 page 2-462

C Big game **winter range values** within the Decision Area are covered in Chapter 3 page 3-42 and Chapter 4 page 4-129 and 4-130.

These areas are the darkest, coldest areas with the deepest snow to be found in this area. Any biologist will point out that these are the area's ungulates migrate from not to. No matter what you do deer naturally go to where the sun shines and the snow is not so deep.

Possibly the alternative J1H could be acceptable if the roadless area remained intact along with any low elevation Old Growth.

Thank you
Beth Butters

AUG 2 : 1990

August 20, 1990

Dear

I just want to make my one small voice heard. Hopefully this won't fall on deaf ears. Again hopefully it is not to late for our environment.

Our "National Forest" is grossly mismanaged.

I recently flew from Spokane, Washington to Seattle, Washington and to Portland, Oregon. I was shocked at what I saw. "Clear Cuts" are giant bill boards saying our forest are being "raped"!

The valley I live in in Idaho is scheduled to be "raped" this year. I'm sounding my small protest to you. Can't this be stopped before it is to late for all of us.

A

Iam not against logging Iam just against how and how much it is being done.

Why do we always try to correct our mistakes when it is too late. Why can't we just once stop it before it is too late.

I'd sure like to leave some forest producing air for my children and grand-children, not problems for them to solve.

Thanks for listening to my feeling on this matter.

Sincerely,

Barbara Block

8-29-90

Gary -

I sent this letter off to everyone from the President on down.

I hope somehow my letter will count for something.

Please consider the West Moyie DEIS as a place to start and do something right for a change.

Thanks

Barbara Block

BARBARA BLOCK

A **Amount of harvesting,** by harvest method, for each alternative is disclosed in the Alternative Descriptions Chapter 2 pages 2-11 thru 2-34. It is also summarized in Table 2-2, page 2-41.

The **effects of harvesting method, including clearcutting,** are discussed by resource as follows:

(a) **Roadless Values** - Chapter 4 pages 4-9 and 4-10
(b) **Water Quality** - Chapter 4 page 4-24
(c) **Visual Quality** - Chapter 4 page 4-68
(d) **Wildlife** - Chapter 4 pages as follow:
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- **Goshawk** - page 4-110
- **Pine Marten** - page 4-116
- **Pileated Woodpecker** - Appendix D page D-14
- **Elk** - pages 4-125 and 4-126
- **White-tailed deer** - pages 4-129 and 4-130

(e) **Biodiversity** - Chapter 4 pages 4-141, 4-143, and 4-147.
(f) **Soil** - Chapter 4 page 4-152

INLAND EMPIRE PUBLIC LANDS COUNCIL

P.O. Box 2174 Spokane, WA 99210 · W. 315 Mission Spokane, WA 99205
(509) 327-1699

Gary N. Rahm, Ranger
U.S. Forest Service
Route 4 Box 4860
Bonners Ferry, ID 83805-9764

August 27, 1990

AUG 29 1990

Mail that - original

Dear Ranger Rahm,

Thank you for this opportunity to comment on the West Moyie DEIS. These comments will be further supplemented by the Council's forest watch coordinator, Barry Rosenberg, in a separate letter.

Of concern is the US Forest Service's treatment of the Hellroaring Roadless Area (1-128). The agency has failed to provide the public with an economic analysis of the various alternatives as it relates to timbering the roadless area. As is discussed by plaintiffs in ICL v. Mumma, the USFS has failed to assess in the IPNF Forest Plan EIS whether timber in each roadless area is worth exploiting. As with the Plan EIS, the West Moyie DEIS contains no adequate economic analysis of alternatives for the Hellroaring Roadless Area. A

The West Moyie DEIS also fails to discuss an alternative that the agency's timber targets in the Plan for the Bonners Ferry Ranger District could be met without entering the Hellroaring Roadless Area. Plaintiffs in ICL v. Mumma pointed out that flaws in the agency's economic assumptions regarding timber values have led the agency to faulty conclusions in the Plan. The agency's decision to undertake the West Moyie DEIS tiers to the Plan, which is based on flawed economic assumptions. B

The U.S. Forest Service has released the West Moyie DEIS without correcting the wilderness review deficiencies found in the IPNF Land and Resource Management Plan. The West Moyie final EIS should reveal to the public the value of the timber in the Hellroaring Roadless Area and should consider the alternative of timbering on already roaded lands in lieu of developing this roadless area. C Finally, the West Moyie EIS should consider a wilderness recommendation for the Hellroaring RA because the U.S. Forest Service, in the ROD for the IPNF Plan, has not explained its decision not to recommend the area for wilderness. D

Again, thank you for this opportunity to comment.

Sincerely,

John Osborn

John Osborn, MD
Council Coordinator

A **Economic analysis of harvesting timber in the Hellroaring Roadless Area** is discussed in Appendix E pages E-1 and E-2.

B Discussion of the **alternatives to produce the Decision Area's share of the Forest Plan harvest volume without entering the Hellroaring Roadless Area** is in Chapter 5 page 5-6.

C The **roadless areas share of the present net costs and benefits for each of the action alternatives that enter the Hellroaring Roadless Area** is displayed in Appendix E pages E-2 and E-3, The roadless area total volume is displayed in Chapter 3 page 3-69.

D An alternative discussing **Wilderness designation** for the Hellroaring Roadless Area is located in Chapter 2 page 2-38 under the sub-heading, Alternatives Not Considered in Detail.

August 28, 1990

To: Gary N. Rahm, District Ranger
Bonners Ferry Ranger District

From: North Moyie River/Round Prairie Residents

Re: Draft EIS, West Moyie Timber Sale

This letter is in response to the Draft EIS for the proposed West Moyie Timber Sale. This letter is in addition to the comments already forwarded to you on our earlier signed petition (unsigned copy attached) and additional written and oral comments.

We have reached the recommendations below after a study of the EIS and much discussion with our neighbors. Our discussions with our neighbors reflected unanimous and deep concern over past harvest methods, apparent reforestation failures, and questionable forest management practices in the Round Prairie and East Moyie areas and their resultant effects on the forests and wildlife.

A

We disagree with the agency preferred alternatives (J1, J2, J2H) because of a number of factors: quantity, harvest methods, impact on large and small wildlife, and failure to recognize adequately and to preserve the character and quality of the area at issue. We are heedful, however, of the necessity of harvest from this area to reduce long term risks from disease and insects and to provide a reasonable amount of activity for the local mills and the subservient economy.

We therefore propose the following alternative:

[1] Alternative E (Roadless), plus
[2] the helicopter alternative described in J2H, plus
[3] adding to the helicopter alternative (i.e. harvest by helicopter or by other roadless methods) all those stands from J1 which are high risk stands and all those stands whose proposed harvest methods leave at least 50% of the existing trees.

Our reasons for this proposal are simple. First, Alternative E plus the current helicopter option provides a 12.8 MMBF harvest: 2.6 MMBF more than alternative J1 and .8 MMBF more than alternative J2. Adding the high risk stands and the 50%- stands to current helicopter option adds perhaps an additional 1.5 - 3 MMBF. Thus, the volumes from this proposal exceed those from 2 of the 3 agency preferred alternatives. Second, the proposal basically meets the visual quality objectives in the West Moyie. Third, this proposal meets almost all of the stated wildlife goals of the preferred proposal plus it offers greater long range wildlife preservation/enhancement by providing for a larger area of secure habitat. Fourth, the primitive quality and character of the West Moyie will not be greatly altered by this proposal: the trails in this area, heavily used by residents and many others will retain their utility and will continue to offer a

NORTH MOYIE RIVER / ROUND PRAIRIE RESIDENTS

A **Alternative EH** is described in Chapter 2 page 2-18. Table 2-2 page 2-41 summarizes the Features of Alternatives in a comparative format.

Chapter 4 discusses the **effects of this alternative** as follows:

(a) **Roadless** - page 4-14
(b) **Water Quality** - pages 4-29 and 4-45 thru 4-48
(c) **Visual Quality** - pages 4-82 and 4-84
(d) **Wildlife** - pages 4-106, 4-113, 4-121, 4-127, 4-133
(e) **Recreation** - pages 4-168
(f) **Cultural Resources** - page 4-177
(g) **Air Quality** - 4-182
(h) **Soil Productivity** - 4-187

Chapter 2, Comparison of Alternatives, starting on page 2-42 discloses the effects of Alternative EH in a format comparing it to other alternatives.

quality primitive experience; the mountains will not be scarred by roads and the erosion, sloughs, and slumps often associated with such roads nor will they be scarred by unsightly clearcuts and sparse seed tree cuts; and local residents will not be subjected to the disruption and perils that additional hunting pressure would bring to this area.

In a nutshell, we believe that our proposal is the ultimate for this area under the concept of multiple use. A rich harvest of forest products will co-exist will other traditional and prudent uses of the forests in a complimentary and noncontroversial manner.

We are aware that helicopter logging may not be as economically attractive for some stands as more traditional methods which depend on the construction of roads. We do not believe that these economic factors are significant in the long term picture. As the residents and property owners we have a large economic stake in this proposed timber sale: our property values and way of life could be drastically affected by the decision in this matter. We did not invest our lives and life savings in this area to see it despoiled for a few extra and/or cheap sawlogs. Our proposal represents a compromise which we believe will best meet the needs of all north Idaho citizens and will serve the best long term national interests.

We urge your consideration and adoption of our proposal.

Howard Monks

Howard Monks
HCR 61, Box
Bonners Ferry, Idaho 83805

Dr. Richard P. Luedtke

Dr. Richard P. Luedtke
P.O. Box 14
Eastport, ID 83826

Wayne A. Fox

Wayne A. Fox
HCR 61, Box 189
Bonners Ferry, Idaho 83805

To: Gary N. Rahm, District Ranger
Bonners Ferry Ranger District

From: North Moyie River-Round Prairie Residents

Re: Proposed West Moyie Timber Sale

We live in the Moyie River-Round Prairie area because of its beauty, relative isolation, and the quality life-style it currently offers. We live here to enjoy observing wildlife and fowl, to enjoy the beauty of and access to the river, streams, lakes, and ponds, to enjoy the beauty and sport offered by the mountains, meadows, and forests. We spend an important part of our lives outdoors in the forests, on the trails, and along the water courses. When not outdoors we spend important quality time observing its beauty, creatures, and open space from our homes.

Not only is the quality of our daily lives intimately tied to the forests and mountains, but our real property values are also. For many of us, our real property represents the investment of the efforts of a lifetime and we fear that current forest management practices are having a negative impact on our property values.

For the above reasons we are very concerned about the scope and extent of the proposed West Moyie timber sale.

Before stating our concerns and wishes with respect to the proposed West Moyie sale, we wish you to know that most of us are not opposed to the careful, prudently managed, selective harvesting of trees. However, we are strongly of the opinion that many of the forest harvest practices so far exhibited in the East Moyie, Hogue-Border Mountain, Hall-Mission-Harvey Mountain, Bethlehem-Tungsten-Buzzard-Hell Roaring Mountain areas have not been careful or prudently managed. It is our opinion that forest management in above named areas have quite adversely impacted us in the following areas: visual quality, quantity and quality of wildlife and fowl populations, soil and slope stability, water quality and year around surface water retention, and the privacy of our lands and homes.

Therefore, with respect to the proposed West Moyie timber sale we offer the following remarks:

1. We are totally, adamantly, and unequivocally opposed to clear cutting and sparse seed tree harvest methods. We think these methods should be used only in diseased stands and then only when it is absolutely clear that no other harvest method will stop the the progress of the disease. We support harvest methods and volumes which do not adversely affect visual quality and strongly oppose harvest methods and volumes which would detract from the beauty and character of the West Moyie-Round Prairie area. B

2. We are opposed to the construction of new roads. Roads cause the most serious long range environmental damage: visual scars, erosion, slope instability, lowering of water quality, loss of secure wildlife and fowl habitat, lowering of wildlife populations due to increased hunting opportunities and pressures, access to delicate ecological areas now secure, etc. If any new roads are allowed, they should be kept to an absolute minimum and then closed when not in actual use during logging and regeneration operations. C

NORTH MOYIE RIVER / ROUND PRAIRIE RESIDENTS (Petition)

B **Amount of harvesting**, by harvest method, for each alternative is disclosed in the Alternative Descriptions Chapter 2 pages 2-11 thru 2-34. It is also summarized in Table 2-2, page 2-41.

The **effects of harvesting method, including clearcutting**, are discussed by resource as follows:

(a) **Roadless Values** - Chapter 4 pages 4-9 and 4-10
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(c) **Visual Quality** - Chapter 4 page 4-68
(d) **Wildlife** - Chapter 4 pages as follow:
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- **Pine Marten** - page 4-116
- **Pileated Woodpecker** - Appendix D page D-14
- **Elk** - pages 4-125 and 4-126
- **White-tailed deer** - pages 4-129 and 4-130
(e) **Biodiversity** - Chapter 4 pages 4-141, 4-143, and 4-147.
(f) **Soil** - Chapter 4 page 4-152

C The **mileage of road construction**, by alternative, is summarized in Chapter 2 Table 2-2 on page 2-41.

Road Management is outlined in Chapter 2 Features Common to All Action Alternatives, page 2-9.

Description of Alternative I, Chapter 2 page 2-22, identifies addtional **road closures**. Maps accompanying the Final EIS show the locations of road closures.

Effects of roads on specific resources are shown in Chapter 4 pages 4-9, 4-24, 4-68, 4-116, 4-125, 4-129, 4-141, 4-143, 4-147, 4-149, 4-163, 4-164 4-176, 4-180, 4-184, 4-185, and 4-187.

Those of us who have lived here a long time know that the deer and bear populations have diminished greatly. This decline has been in proportion to and concomitant with road building by the Forest Service throughout this entire area. Therefore, we would recommend that many roads now open to vehicular traffic be seasonally closed during big game birthing and hunting seasons so that the game populations could be kept at a level which would provide serious hunters with a quality hunt and provide non-hunters with the maximum opportunity for wildlife observation. Candidates for these seasonal closures would be the roads serving the high Queen, Buzzard, and Hell Roaring Ridges, lower Hogue-Border Mountain-Robinson Lake-Gillon Creek areas, lower Copper-Ruby Mountain areas, and lower Harvey-Mission Mountain areas.

3. It is obvious that current silvicultural practices do not always work: the are large clearcuts which have been very slow to regenerate if at all, seed tree cuts where many of the seed trees were destroyed during the burning process or became windfalls, seed tree cuts where there is little or no regeneration of either trees or browse, etc. Therefore, in the final planning of the West Moyie sale only those harvest and regeneration methods should be considered which have been proven by long experience to work in areas of similar soils, slopes, exposures, precipitation, etc. D

The regeneration process should be monitored very carefully and timely steps taken to rectify any regeneration process that appears to be going awry.

4. The existing trail systems, especially those serving Queen Lake, Queen Mountain, Queen-Buzzard Ridge, Rutledge Creek, Buzzard Mountain, west Hell Roaring Mountain, and Ruby Ridge should be preserved and enhanced. Harvesting of timber along these trails should be avoided. These trails offer an important avenue into the forests not only for ourselves but for all who come to nondestructively enjoy this resource. E

5. Care should be taken to protect the quality of the surface of the Moyie River Road during logging operations. Residents and users of this road also need protection from dust and other hazards associated with logging operations.

H

6. Perhaps all involved in this timber sale should conceive of this area as having very special scenic and spiritual resources instead of thinking of it merely as a tree farm. With careful planning logging, daily living, sport, and recreation could peacefully and profitably coexist. An investment in low impact recreation for this area could boost the local economy and would allow the opportunity to all citizens of our country to enjoy the wonders we who live here are privileged to enjoy every day.

Thank you for soliciting our input.

D **History of harvesting within the vicinity** of the West Moyie Decision Area is shown in Chapter 3 pages 3-74 thru 3-76.

E **Impacts to the trail system** are shown by alternative in Chapter 4 pages 4-163 thru 4-175.

H **Meadow Creek Road** is discussed in Chapter 5 page 5-4.

P. O. Box 127
Eastport, Idaho 83826

September 5, 1990

SEP 6 1990

District Ranger
Bonners Ferry Ranger District
Rt. 4, Box 4860
Bonners Ferry, Idaho 83805

Sir:

I live in the area of Eastport and Round Prairie, and my family owns property along the Moyie River. It has come to my attention that the mountains that I love that surround these areas are soon to be scarred with clear cut areas.

I know that the U.S. Forest Service has its reasons for doing what they plan to do, and I understand that our local economy depends upon the timber industry to a large degree. I myself have been supported by the timber industry and I'm behind it 100%. I understand it is more economical supposedly to clear cut, but I am having difficulty understanding the necessity of clear cutting when the select cutting process of timber harvest is also effective and does not devastate the land as much if done properly. The wildlife gain their browse areas, the soil base stands less chance of erosion, and the rivers and streams are not damaged by the erosion. Above all else, there would not be the ugly scars upon our landscape, scars that will be visible for decades. I have heard reasons supporting clear cuts, and I have read the EIS you distributed, but these reasons and proposals seem so weak and insignificant compared to the irreparable damage that will be caused. A

As a resident of the area who plans to live here the rest of my life and would like to enjoy the beauty of the mountains and rivers, I would like to request that you please reconsider your plans to clear cut these areas. Please don't make a mistake that cannot be corrected.

Hopefully, my letter will not be the only one you receive. I know many residents in this area are upset and concerned by your proposals. You claim that the public's input and comments are welcomed. I hope that this request will be welcomed and considered, not ignored.

Sincerely,

Roberta Miller

Roberta Miller
A Concerned Resident

ROBERTA MILLER

A **Amount of harvesting**, by harvest method, for each alternative is disclosed in the Alternative Descriptions Chapter 2 pages 2-11 thru 2-34. It is also summarized in Table 2-2, page 2-41.

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- **Elk** - pages 4-125 and 4-126
- **White-tailed deer** - pages 4-129 and 4-130

(e) **Biodiversity** - Chapter 4 pages 4-141, 4-143, and 4-147.
(f) **Soil** - Chapter 4 page 4-152

Box 446
Bonners Ferry, Idaho 83805

September 4, 1990

Panhandle National Forest
Bonners Ferry Ranger District
Bonners Ferry, Idaho 83805

RE: West Moyie Timber Sale

RECD [illegible]
SEP 5 1990

Dear Sirs:

As concerned citizens of the preservation of nature and the impact logging has on the environment, we wish to give the following views on the above proposed timber sale.

We definitely do not approve of clear cuts and the unsightly after-effects left behind by a lot of timber sales. A

In regard to the above proposed sale, we would prefer not to see any logging at all, but if prudent thinning can be done with no messes left behind and a minimum of road building (if any), then perhaps some logging would be justified.

Also, as we own several of Lane's Subdivision lots upstream from the Earl Lane Bridge, a major concern of ours is the road going into our property which we understand will be the main one for the logging trucks to use. The traffic, dust, and danger of all the truck traffic, etc., definitely is not something we're looking forward to. Also, building of roads in that area would only cause more traffic and problems once the logging operation has ceased. B

We appreciate your time and concern given to our thoughts and ask to be included in any future mailings, meetings, etc. on the West Moyie Timber

HOLLICE & DOROTHY SMITH

A **Amount of harvesting**, by harvest method, for each alternative is disclosed in the Alternative Descriptions Chapter 2 pages 2-11 thru 2-34. It is also summarized in Table 2-2, page 2-41.

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- **White-tailed deer** - pages 4-129 and 4-130

(e) **Biodiversity** - Chapter 4 pages 4-141, 4-143, and 4-147.
(f) **Soil** - Chapter 4 page 4-152

B Road management and access plans are discussed in Chapter 2 page 2-9. The timber sale contract, incorporated by reference contains provisions that deal with dust and traffic/road safety.

— 2 —

Sic. Thank you

Very truly yours,

Hollice J. Smith
Hollice D. Smith

Dorothy Smith
Dorothy Smith

P.O. Box 446
Bonners Ferry Idaho, 83805

208-267-2786

State of Idaho
DEPARTMENT OF HEALTH AND WELFARE AUG 1990
Division of Environmental Quality

1410 N. Hilton
Boise, Idaho 83706

CECIL D. ANDRUS
Governor
RICHARD P. DONOVAN
Director

August 15, 1990

Gary N. Rahm
District Ranger
Bonners Ferry Ranger District
Route 4 Box 4860
Bonners Ferry, ID 83805

Dear Mr. Rahm:

The Water Quality Bureau has received and reviewed the West Moyie Draft Environmental Impact Statement. It is apparent that Forest service personnel developing the DEIS have consulted with the Bureau's Coeur d' Alene field office on the Meadow Creek public water supply. The domestic water supply use has been identified and a specific criterion designated for protection of the use.

While the DEIS was in development the Bureau began implementation of the " federal consistency" language incorporated into section 319 during the 1987 amendments of the Clean Water Act. Federal consistency requires federal projects to be consistent with State water quality standards and nonpoint source management plans. As a guide to the Idaho Water Quality Standards and Wastewater Treatment Requirements, which are complex and often confusing, the attached checklist has been developed for addressing the standards in planning document.

The West Moyie DEIS has been reviewed using the checklist to assess complete consideration of State water quality standards. The DEIS identifies the nonpoint source activities likely to affect water quality. The document lays out a sufficient monitoring plan and a feedback mechanism to adjust and improve the BMPs. A very useful discussion of current water quality and the projected impact of the alternatives has been provided.

Some deficiencies in consistency with the water quality standards were identified. The Forest Service BMPs are identified in appendix C, but the document should also identify the Idaho Forest Practices Act Rules and Regulations as the minimum State approved BMPs. The case can then be made that the Forest Service BMPs meet or exceed the minimum standard. The specific beneficial uses of each planning area stream should be identified in the document. If these are not designated in the State standards the document should designate those uses based on attainable uses and collected data. Once beneficial uses are identified specific water quality criteria, which will provide protection for the uses should be identified. This approach provides the monitoring program the required benchmarks for assessment of impacts to beneficial uses.

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STATE OF IDAHO DEPT OF HEALTH & WELFARE

See checklist on following pages

Gary N. Rahm
Page -2-

The discussion of the domestic water supply uses on Meadow Creek and a criterion to protect it is an excellent model for addressing all beneficial uses. In order to comply with recently added antidegradation rules, stream segments of concern and/or outstanding resource waters located in the planning area should be identified. If none are located in the area, this fact should be stated.

These comments are designed to orient the forest planners to the type of information required in planning documents for Bureau personnel to assess compliance with federal consistency with State water quality standards. The deficiencies identified should be addressed in the final EIS. If you have questions regarding the checklist or review comments, please contact Geoff Harvey (208-334-5860).

Sincerely,

Robert L Brown

For Al E. Murrey, P.E.
Chief, Water Quality Bureau

AEM;GWH:kjb

Enclosure

RLC'D [illegible]

SEP 12 1990

<u>Federal Consistency Checklist for Planned Projects:</u>

(Pertinent sections of the Water Quality Standards are referenced and need to be used in conjunction with the checklist.)

1. Have you identified which nonpoint source activities regulated by the Idaho Water Quality Standards are within the project area? **A**

   IDAPA 16.01.2003,28. -Nonpoint source definition.

2. Have you identified the state approved BMPs for each nonpoint source activity? **B**

   IDAPA 16.01.2300,05. -List of approved BMPs.

3. For nonpoint source activities which do not have approved BMPs, have you identified practices that demonstrate a knowledgeable and reasonable effort to minimize resulting water quality impacts? **C**

   IDAPA 16.01.2300,04.a. -Nonpoint source restrictions.

(Note: BMPs identified in the <u>Idaho Agricultural Pollution Abatement Plan</u> (Id. Dept. of Health and Welfare, 1983) and the <u>Best Management Practices for Road Activities</u> (Levinski, 1982) constitute knowledgeable and reasonable effort for these activities.)

4. Have you provided a monitoring plan which, when implemented, will provide adequate information to determine the effectiveness of the approved or specialized BMPs in protecting the beneficial uses of water? **D**

   IDAPA 16.01.2300,04.c.ii. -Monitoring plan requirements.

5. Have you provided a process (including feedback from water quality monitoring) for modifying the approved or specialized BMPs in order to protect beneficial uses of water? **E**

   IDAPA 16.01.2300,04.c.iii. -Modification of BMPs.

1

STATE OF IDAHO DEPT OF HEALTH & WELFARE (continued)

A **Nonpoint source activities** are identified in Chapter 2 page 2-3 under Issue 2: Water Quality.

B Deficiency noted in previous letter. Modifications to Appendix C provide a discussion of **Forest Service Soil and Water Conservation Practices and how they relate to State of Idaho BMP's**.

C **Nonpoint source restrictions.** Not applicable.

D **Monitoring Plan** is shown in Chapter 2 pages 2-35 thru 2-37.

E Appendix C page C-14 and C-15 outline the BMP **Feedback loop** for modifying the BMP's.

6. Have you listed the "appropriate beneficial and existing uses" of water for the waterbodies in the project area? F

IDAPA	16.01.2003,01.	-Definition of appropriate beneficial use.
IDAPA	16.01.2100,	-Water Use Classification.
IDAPA	16.01.2101,	-General Water Use Designation.
IDAPA	16.01.2102,	-Special Resource Waters.
IDAPA	16.01.2110,01	-Designated uses within the Panhandle Basin-Table.
IDAPA	16.01.2120,01	-Designated uses within the Clearwater Basin-Table.
IDAPA	16.01.2130,01	-Designated uses within the Salmon Basin-Table.
IDAPA	16.01.2140,01	-Designated uses within the Southwest Idaho Basin-Table.
IDAPA	16.01.2150,01	-Designated uses within the Upper Snake Basin-Table.
IDAPA	16.01.2160,01	-Designated uses within the Bear River Basin-Table.
IDAPA	16.01.2051,01	-Maintenance of existing uses for all waters. Existing use is any use attained on or after November 28, 1975.

7. Have you incorporated the State Antidegradation Policy into the project plan? G

IDAPA 16.01.2003,52.	-Definition of Stream Segment of Concern.
IDAPA 16.01.2051,	-ANTIDEGRADATION POLICY
,01.	-Maintenance of Existing Uses for All Waters.
,02.	-High Quality Waters.
,03.	-Outstanding Resource Waters.
IDAPA 16.01.2052,01-08.	-PUBLIC PARTICIPATION.

The state policy complies with the Clean Water Act water quality standards regulation, 40 CFR 131.12 (40 FR 51400, November 8, 1983). The policy is implemented through a number of changes to state laws, rules and regulations. Public participation occurs through Basin Area Meetings in determining Stream Segments of Concern. A copy of this list of segments can be obtained from DEQ. Additional monitoring is required and site-specific BMPs may be specified for forest practice activities. The land manager should contact Idaho Department of Lands for site-specific BMPs which may apply in watersheds of stream segments of concern. DEQ should be consulted regarding monitoring requirements.

2

STATE OF IDAHO DEPT OF HEALTH & WELFARE (continued)

F Deficiencies in **listing appropriate beneficial and existing uses of water** as noted in previous letter. This item is now included in Chapter 3 pages 3-16 thru 3-20.

G Deficiencies in incorporating **State Antidegradation Policy** as noted in previous letter, is now addressed in Chapter 3 page 3-12. It states that there are no "Stream Segments of Concern" within the Decision Area.

8. Have you determined if and Outstanding Resource Water (ORW) has been designated in the project area? H

IDAPA 16.01.2003,31. -Definition of Outstanding Resource Water.
IDAPA 16.01.2053,01-07 -OUTSTANDING RESOURCE WATERS.

Nominations for ORWs are made to the Board of Health and Welfare. The Board provides an opportunity for public comment and may hold a public hearing. Based on this information the Board makes a recommendation to the legislature which may designate a segment by law.

If an ORW occurs within the project area, nonpoint source activities will be subject to BMP restrictions to ensure that water quality of the ORW shall not be lowered. No person or federal agency shall be allowed to conduct a new or substantially modify an existing nonpoint source activity that can reasonably be expected to lower the water quality of that ORW, except for conducting short term or temporary activities which do not alter the essential character or special uses of a segment, allocation of water rights, or operation of water diversions or impoundments.

9. Have you identified the water quality standards and criteria applicable to protecting the "appropriate beneficial uses"? I

IDAPA 16.01.2200, - 2280, -Water Quality Criteria.

10. Does pre-project planning and design include an analysis of water quality resulting from implementation of the proposed activity sufficient to predict exceedence of water quality criteria for the appropriate beneficial use(s), or in the absence of such criteria, sufficient to predict the potential for beneficial use impairment? J

The analysis should include an evaluation of current status and predicted condition of beneficial uses in the subject watershed, and should address physiographic conditions such as land type, soils, and vegetation which influence erosion and mass wasting. The analysis should address changes in habitat which may impact the beneficial use as a result of nonpoint source activities. The analysis of beneficial use impairment shall utilize parameters and protocols outlined in the Statewide Coordinated Monitoring Plan (to be completed in 1989).

Administrative policies and standards of the State Water Quality Standards require protection for appropriate beneficial uses.

IDAPA 16.01.2050,02 -Administrative policy.
IDAPA 16.01.2300,02 -Limitation to discharge of pollutants.

3

STATE OF IDAHO DEPT OF HEALTH & WELFARE (continued)

H Deficiencies in identifying **Outstanding Water Resources within the Decision Area** as noted in letter; this item is now discussed in Chapter 3 page 3-12.

I Deficiencies in identifying protection for **appropriate beneficial water uses** are now discussed in Chapter 4 pages 4-24 thru 4-26.

J **Current status of the water resource** is described in Chapter 3, pages 3-12 thru 3-20. Chapter 4 pages 4-26 through 4-30 discusses **predicted effects of each alternative**.

REC'D BFRD

SEP 10 1990

EIS

CHARLES SHEROKE
Attorney at Law
1621 Lost Avenue
Coeur d'Alene, ID 83814

September 7, 1990

Idaho Panhandle National Forest
Attention: Gary N. Rahm, District Ranger
Bonners Ferry Ranger District
Route 4, Box 4860
Bonners Ferry, ID 83805

Re: Comments to the West Moyie
Draft Environmental Impact Statement

Dear Mr. Rahm:

The crux of my comments will center upon the West Moyie's (project) impact upon Wildlife. Obviously, the project's purpose is to provide as much timber as possible to area mills. Unfortunately, it appears that this supply side oriented forest management practice will fulfill its purpose regardless of its devastating impacts on wildlife.

Within the project area lies the Hellroaring Roadless Area No. 1-128. This area previously consisted of 11,700 acres but due to persistent timber sales the remaining area has been whittled to approximately 8,800 acres. Each preferred alternative would further reduce the remaining roadless acreage to less than 5,000 acres negating any future Wilderness consideration.

Should the Hellroaring Roadless Area be eliminated from the wilderness base a district wide analysis should be provided addressing this fact. This analysis should graphically display what other wilderness opportunities remain in the district in comparison to other multiple uses (timber, motorized recreational use, etc.). A Additionally, an economic analysis must be undertaken showing the economic consequences associated with the irretrievable loss of the wilderness area. The DEIS at Appendix E could leave the ill-informed reader with the mistaken impression that only timber cutting generates revenues. Of B

CHARLES SHEROKE

A **A district-wide analysis of the roadless areas and potential for Congressional designation as wilderness areas** is now included in Chapter 4 pages 4-3 thru 4-8

B **Economic analysis of entry into the roadless area and its ability/inability to be designated as wilderness** in the future is discussed in Appendix E, pages E-1 and E-2.

course, wilderness also generates revenues in the form of hiking, camping, hunting, outfitter revenues, and other tangible and intangible valuations.

Finally, if an action alternative is selected which allows for further intrusions into the roadless area any forthcoming wildlife analysis must address these impacts assuming a total elimination of the roadless area. Since any action eliminating a wilderness option for this area will inevitably, irretrievably, and foreseeably lead to its total demise. This was not done in the draft and should be rectified.

C

INDICATOR SPECIES

Elk habitat is the indicator for summer range conditions for all big game species and the indicator to demonstrate security habitat for Threatened, Endangered and Sensitive species. (DEIS Survey p. 8) The indicator used to determine the effect of the proposed action on elk habitat is a habitat effectiveness rating. At present (no-action) the project area has a 56 percent effectiveness rating. A rating below 50 percent is cause for concern. Since the area is now only slightly above the viability threshold great care must be taken to insure all impacts are accurately addressed.

One of the criteria for assessing Elk habitat effectiveness is road densities. The figures used to establish effectiveness ratings for each alternative considered are all post sale (road-closure) estimates. These figures fail to acknowledge that roads closed with barriers provide access that was non-existent prior to road construction and that the same amount of security cannot be attained by merely closing roads. (See Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho.) Therefore, closed roads have an effective open road value associated with them. Adding together the actual miles of open roads and the values assigned to closed roads results in miles of effective roads. Road density is then determined by dividing the total miles of effective roads by the number of square miles in the Wildlife Analysis Area. (See DEIS, Leola Timber Sale, USDA, Forest Service, p. I-7.) (See also 40 C.F.R. § 1502.24.)

D

This is also true for all other wildlife species analyzed. For example, the white-tailed deer winter analysis assumes human activity will be controlled through access/ management. It does not account for security loss which can not be mitigated by subsequent road closures.

SHEROKE (continued)

C **Analysis of impacts to wildlife by entering the roadless area and reducing it below the acreage minimum for wilderness designation** is discussed under Alternative J2H. This alternative would leave virtually zero acreage in an undisturbed state and therefore, approximates total loss of wilderness characteristics. See Chapter 4 pages 4-107, 4-115, 4-124, 4-127, 4-136, and Chapter 2 Comparison of Alternatives page 2-52.

D **Road impacts to elk summer range and white-tailed deer winter range** are disclosed in Chapter 4 pages 4-125 and 4-129.

BOREAL OWL

All alternatives begin with nesting habitat that is below the 30 percent threshold level. This statistic is even more alarming since "threshold levels are estimates for an unmanaged situation and should be applied with caution in a managed situation." Each preferred alternative calls for the elimination of the unmanaged (roadless) situation. Additionally, each alternative (except A) further reduces suitable nesting stands below acceptable levels. (See 36 C.F.R. 219.29) "Forest Plan standards would not be met that require the Idaho Panhandle National Forest to maintain at least minimum viable populations of management indicator species distributed throughout the forest." Very little is known about the habitat requirements of the owl particularly in managed situations. Until sufficient data is collected the assumptions contained in the DEIS are unacceptable.

E

NORTHERN GOSHAWK

Each alternative considered (except A) would either reduce feeding or nesting habitat below minimum levels. Since Goshawks are extremely susceptible to any disturbance near their nesting sites some analysis must be made of activities on adjacent private lands. This is especially true here since much of the most suitable nesting habitat is located in the low elevation areas adjacent to private lands. It would appear unlikely that two pair of goshawks could be maintained in the project area if a cumulative analysis (including adjacent private lands) was prepared.

F

PINE MARTIN

Two pine martin units in the decision area due to prior management activities do not meet minimum cover requirements and are therefore unsuitable. Only alternatives A and E would not further reduce habitat requirements. Essentially, those pine martin which remain in the decision area constitute a genetic island which are prevented from dispersing due to prior timber sales in the area. A cumulative analysis examining all past, present, and reasonably foreseeable future management activities (including private lands) only makes the pine martins survival scenario appear even more bleak.

G

At Chapter 4-91 under the heading Consistency With the Forest Plan it states "Reduction in habitat which does not cause a decline in population and thereby cause a species to become

SHEROKE (Continued)

E **Boreal owl** is discussed in Chapter 4 pages 4-104 thru 4-109.

F **Northern Goshawk** is discussed in Chapter 3 pages 3-38 thru 3-40 and Chapter 4 pages 4-110 thru 4-115

G **Pine Marten** are discussed in Chapter 4 pages 4-115 thru 4-125; also see discussion of **travel corridors** under the **Biodiversity** portion of the Vegetation sections, pages 3-54 ane 3-55 and pages 4-147 and 4-148.

threatened or endangered is consistent with the Forest Plan standards. However, a decline in a population that would effect the long term viability of a species would not be consistent with the Forest Plan.

If we turn to the Forest Plan (pp. 11-28) standards it states that the IPNF would maintain at least minimum viable populations of management indicator species distributed throughout the Forest. As a direct result of habitat loss the pine martin (in the project area) has become isolated preventing biological diversity and dispersal. Although habitat loss will not result in an immediate population decline it will result over a period of time in the loss of a viable pine martin population.

The DEIS at p. 1 asserts:

The purpose of the proposed timber harvest and road construction activities addresses the following needs:

1) To provide the amount of timber that this area can supply for area mills.

2) To reduce the risk of insect and disease mortality and provide for long-term increased sustain yield of wood products of desired species and size.

3) Improve big-game winter range habitat for this area.

Essentially, what these needs translate to is that the Forest Service intends to clear-cut as much timber as possible. This will occur regardless of the environmental impacts and despite a professed policy of multiple-use.

Need One (1) clear-cutting enhances the volume of timber provided for area mills. Need Two (2) mandates clear-cutting since that is the only method utilized by the Forest Service to reduce insect and disease mortality. (See the Yaak.) Need Three (3) roads and timber cutting obviously do not enhance big-game winter habitat. That is unless, of course, you intend to increase forage areas which is achieved by clear-cutting. However, the prevalence of forage resulting from past forest management activities (clear-cuts) near the project area certainly indicates additional browse is not needed. Additionally, utilization of browse in clearings is limited in

H

SHEROKE (Continued)

H The **Impacts of clearcutting** are discussed throughout the Final EIS. Amount of clearcutting is displayed by alternative in Table 2-2 page 2-41.

Gary N. Rahm - Comments
September 7, 1990
Page 5

winter months making any benefit negligible. However, the additional access caused by roads and the loss of thermal cover caused by extensive cutting certainly will diminish the quality of big-game winter habitat in the project area. I

Finally, regarding the type of harvest methods proposed for the project. Nothing has been submitted indicating how the various harvest methods (clear-cut, seed tree harvest, overstory removal, etc.) are specifically assessed regarding their impacts on wildlife or water quality. J

Because of its unique character any intrusion into a roadless area (of 5,000 acres or more) must be specifically and individually analyzed. If that intrusion is for timber harvest based upon disease or bug infestation that should be reliably documented.

Impacts upon wildlife, water quality, and fisheries must also be specifically addressed. Utilization of the roadless area by wildlife and, in particular, threatened, endangered, sensitive, and indicator species must be addressed in the individual document. For example, how will the total elimination of the roadless area specifically effect elk and deer populations? If adversely impacted what effect will this have on elk and deer hunting opportunities (which is so popular) in the project area? K

Known impacts associated with private lands have not been cumulatively analyzed with those in the project area. Nor have past, present,and reasonable foreseeable future Forest Service timber management activities been cumulatively addressed (Hell-roaring, East Moyie, etc.). This DEIS fails to take a "hard look" at the actual and foreseeable impacts associated with the proposed project. L

Sincerely,

Charles Sheroke

Charles Sheroke
Attorney at Law

CS:ew

SHEROKE (Continued)

I White-tailed deer **winter range** is discussed in Chapter 4 pages 4-129 thru 4-137.

J **Amount of harvesting**, by harvest method, for each alternative is disclosed in the Alternative Descriptions Chapter 2 pages 2-11 thru 2-34. It is also summarized in Table 2-2, page 2-41.

The **effects of harvesting method, including clearcutting**, are discussed by resource as follows:

(a) **Roadless Values** - Chapter 4 pages 4-9 and 4-10
(b) **Water Quality** - Chapter 4 page 4-24
(c) **Visual Quality** - Chapter 4 page 4-68
(d) **Wildlife** - Chapter 4 pages as follow:
- **Boreal Owl** - page 4-104
- **Goshawk** - page 4-110
- **Pine Marten** - page 4-116
- **Pileated Woodpecker** - Appendix D page D-14
- **Elk** - pages 4-125 and 4-126
- **White-tailed deer** - pages 4-129 and 4-130
(e) **Biodiversity** - Chapter 4 pages 4-141, 4-143, and 4-147.
(f) **Soil** - Chapter 4 page 4-152

Harvest prescriptions which eliminate or create forest openings are the most critical to elk and deer. These include all even-aged regeneration harvest. Prescriptions that reduce hiding cover include Basal Area thinning, Commercial thinning, and some salvage harvests.

K See Comment C on previous page.

L **Reasonably Foreseeable Activities** are listed in Chapter 1 page 1-3 and discussed by resource in Chapter IV. For condition of resources based on past and present activities see Chapter 3 pages 3-1 thru 3-91 and Chapter 4 pages 4-3 thru 4-10, 4-26 thru 4-33, 4-72 thru 4-75, 4-105, 4-110 and 4-111, 4-117 and 4-118, 4-126, 4-130, 4-143, 4-145, 4-147, 4-150, 4-154, 4-159 and 4-165 for narratives of cumulative effects of past and present activities, displayed as Alternative A, No Action.

United States Department of Agriculture

Soil Conservation Service

Rcom 124
3244 Elder Street
Boise, Idaho 83705

REC'D BFRD
SEP 10 1990

September 5, 1990

Gary N. Rahm
District Ranger
Bonners Ferry Ranger District
Route 4, Box 4860
Bonners Ferry, Idaho 83805

SUBJECT: Comments on West Moyie Draft Environmental Impact Statement

Dear Sir:

Comments are:

1. Three stated purposes are listed on page 2. A fourth purpose and need should be to maintain soil and water quality through the use of appropriate best management practices (BMP's). A

2. The second purpose and need identifies long-term increased sustained yield. To achieve a more-balanced age class distribution, the alternative chosen must have silviculture strategies that will provide this balance, realizing that many of the stands affected by this DEIS will have only an 18-to-20 year age difference. With the mix of silviculture prescriptions in the preferred alternatives (J1, J2, and J2H) stretching the balance of age classes is more feasible.

3. When comparing the previously harvested units with all of the 8 action alternatives, it appears that whatever alternative is selected, the units cut on Hellroaring Ridge and the Hellroaring Creek and Little Hellroaring Creek drainages after 1998 will be substantial, if not excessive. This comment is made in light of the concerns expressed about peak flows in the Hellroaring drainage.

BMP's are well defined in the DEIS; however, the Chapter 4, skyline systems are called for on slopes steeper than 35% but practice 13.02 in Appendix C allows ground skidding under certain conditions on slopes of 45% or steeper. B

4. I would recommend that the 35% limit for ground skidding as stated in Chapter 4 be observed.

The Soil Conservation Service is an agency of the Department of Agriculture

USDA - SOIL CONSERVATION SERVICE

A **Purpose and Need** are identified in Chapter 1 page 1-1. **Maintaining soil productivity and water quality** are two of the issues which are addressed. They are not the purpose for proposing the action in the Decision Area. Water quality is addressed on the following pages:

Chapter 2 pages 2-3, 2-7, 2-45 thru 2-47
Chapter 3 pages 3-12 thru 3-20
Chapter 4 page 4-24 thru 4-67
Appendix C in its entirety

Soil productivity is discussed on pages 3-88 thru 3-91 and pages 4-184 thru 4-187.

B Chapter 4 page 4-184 has been corrected to be consistent with BMP 13.02, Appendix C. **Logging systems** were designed in accordance with BMP 14.07, Appendix C, to **minimize soil disturbance**.

Thank you for the opportunity to comment on the DEIS.

Sincerely,

acting

PAUL H. CALVERLEY
State Conservationist

cc:
Don Larson, Moscow AO
Gary Post, AC, Moscow AO
Frank Fink, Biologist, Boise SO

villelli
enterprises
inc.

REC'D BFRD
SEP 10 1990

REALTOR ®

September 6, 1990

Gary N. Rahm, District Ranger
BONNERS FERRY RANGER DISTRICT
Route 4 - Box 4860
Bonners Ferry, ID 83805

REGARDING: REPLY - #1950

Dear Mr. Rahm:

With regard to our comments regarding the West Moyie (DEIS), I would let you know that my comments remain the same as numerous ones we have had over the last few years and this includes that there be adequate dust control; A that those faces that are most visible be logged properly from an aesthetic point of view. B If those areas were logged in such a manner as to leave a sufficient number of seed trees and if those areas were reseeded, then perhaps it would justify the heavier cutting.

My comments also remain the same with regard to our property. If the Forest Service planned access through our property, I would want to make sure that you understand any access would be subject to our approval and would have to be done in a manner that would satisfy the owners.

Thanks for keeping me advised.

Sincerely,

VILLELLI ENTERPRISES, INC.

Dick Villelli

Richard A. Villelli, President

RAV/ja

ailing Address: P.O. Box 2128, La Habra, California 90632-2128 • 1001 W. Whittier Blvd., La Habra, California 90631-3796 / (213) 691-3237 / (714) 526-2291 / Fax (714) 526-0212
R 61, Box 169, Bonners Ferry, Idaho 83805-1278 / (208) 267-7625 / (208) 267-5595 • 5966 County Road 234, Durango, Colorado 81301 / (303) 247-2713

VILLELLI ENTERPRISES, INC. (9/6/90)

A **Meadow Creek Road** is discussed in Chapter 5, page 5-4. The timber sale contract, incorporated by reference page 2-7, contains specific provisions that deal with dust and road/traffic safety.

B **Visual Impacts from harvest** and harvest methods are shown for each alternative in Table 2-2 on page 2-41, and pages 4-68 thru 4-103. Also see pages 2-47 thru 2-52 for a comparison of alternative effects on visual quality.

villelli enterprises inc.

REC'D CFRO
SEP 2 6 1990

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REALTOR®

September 5, 1990

Gary Rahm
District Ranger
Bonners Ferry Ranger Station
Route 4 Box 4860
Bonners Ferry, Idaho 83805

REF: Moyie River Westside DEIS

Dear Gary:

A

A comment I had with regard to the Moyie River study is that I beleive any logging done in the area should be followed by mulching or shredding of all of the slash piles. The Moyie River valley is relatively narrow and as such when there are high pressure periods such as today the 5th of September when there's a good deal of burning going on what we can end up with a terrible problem with the smoke hanging in our valley.

My dad lives in the center of the valley in the area that is proposed to be logged, he only has one lung and I beleive that there would be a distinct possibility that burning under the wrong conditions could endanger his life not to mention the health problems it would create for my children. I realize this alternative may be extremely expensive but I would appreciate if it would be taken into consideration. We go to tremendous expense to protect the lives and well being of numerous animal species, I would hope that the well being of our senior citizens and children and all of us of the human race would have an even higher priority.

Thank you for your consideration.

Sincerely,

Richard A. Villelli
RAV:ak

PS. Gary as an example, today is a beautiful sun shiny day in North Idaho, but as of right now in my home we cannot see the sun because of the burning that just commenced and that will probably last from two to three days on the piles that have just been lit which will mean my children will have to stay indoors. There must be a better way.

Mailing Address: P O. Box 2128, La Habra, California 90632-2128 • 1001 W. Whittier Blvd., La Habra, California 90631-3796 / (213) 691-3237 / (714) 526-2291 / Fax (714) 526-0[illegible]
HCR 61, Box 169, Bonners Ferry, Idaho 83805-1278 / (208) 267-7625 / (208) 267-5595 • 5966 County Road 234, Durango, Colorado 81301 / (303) [illegible]

VILLELLI ENTERPRISES, INC. (9/5/90)

A **Chipping and Mulching of logging residue** are discussed in Chapter 5 page 5. Chapter 3 pages 3-84 thru 3-87 and Chapter 4 pages 4-179 thru 4-183 include descriptions and **effects of slash disposal methods on air quality.** On September 5, 1990, the Bonners Ferry Ranger District broadcast burned a clearcut in the upper portion of Hellroaring Creek, another unit was burned on September 20, 1990.

mark 6.
Stoffler cc

RECD BFRD
SEP 1 0 1990

September 5, 1990

Mark Grant
U.S. Forest Service
Bonners Ferry Ranger District
Route 4, Box 4680
Bonners Ferry ID 83805

SUBJECT: West Moyie Draft Environmental Impact Statement Alternatives

Dear Mr. Grant;

As you know I'm for Alternative A. But I know that's impracticable, especially for the local economy.

I believe my input really doesn't matter to you floks at the Forest Service. To point this out I spent 5 months in 1980 working in conjunction with the Forest Service on the Orser Creek Timber Sale. We had several meetings in the office and field concerning unit 14 which adjoins my property. We agreed that the unit would be kept back 200 ft. from the road and that this 200 ft. greenbelt strip would be a special designation cut (unit 13). We also agreed to use the existing road into the unit.

After all those discussions and meetings-what did you people do? ....Well, you didn't use the existing road. YOU PUT A BRAND NEW ROAD RIGHT THROUGH THE 200 ft. GREENBELT AREA....RIGHT THROUGH THE MIDDLE OF IT.

How could you do something like this. Did you do it on purpose just to agravate the local residents? I think your left hand doesn't know what your right hand is doing and that you don't have ANY interoffice communication.

What I'm trying to say is.....When you get to the bottom line it really doesn't matter how much public imput there is, the Forest Service is going to do what it wants to do anyway.

Enough said on this subject.

As for the West Moyie Draft EIS Alternatives J-1 and J-2 are both fine with me. But visual quality is a primary concern of the local and area residents and this should be addressed. A

In closing I would like to say that you have done a very good job on this Draft EIS but don't let the constraints of this draft tie your hands to the changing of the times.

Sincerely,

Michael J. Bergeron

Micheal J. Bergeron

cc: Gary Rahm
Patrica Shira

MICHAEL BERGERON

A **Visual Quality effects of each alternative** are shown as well as harvest methods in Table 2-2 on page 2-41. See pages 2-47 thru 2-52 and pages 4-68 thru 4-103 for additional comparison of alternatives effects on visual quality.

RECD RFO

SEP 10 1990

West Moyie DEIS Boundary Backpackers

Chapter 3-8

States that White water Rafting takes place from Meadow Creek Campground to Moyie Falls dam. While most of the larger Rapids are on this part of the River; you have ignored the fact that both River outfitters put on 3 miles from Good Grief at County Road 34-B which is the Access to Bussard Mt. Trail #32. Many Novice Rafters put in here and take out at Meadow Creek Campground to avoid the larger Rapids in the lower canyon. The Visuals of the cutting units in all of the Alternatives, including the preferred ones, must be considered for the large & growing numbers of River Runners.

The National Forest land Mgmt plan Mandates, Among other things, the "retention of esthetics and undeveloped landscapes (beyond shorelines)" This quote is from the "Moyie River Wild & Scenic Rivers Final Environmental Statement" (USDA, FS, 1978) A

Chapter 3-11

The R1R4 Sediment Model - This model B

BOUNDARY BACKPACKERS

A **Rafting on the Moyie River** is now added on page 3-10 and 3-81. The Moyie River is identified as sensitivity level one viewpoint, pages 3-21 and 3-24. Visual Quality Objectives are described on page 3-26. The effects of the alternatives on visual quality are disclosed on pages 4-68 thru 4-103. They are shown in comparative format on pages 2-47 thru 2-52.

B **The R1-R4 Sediment Model** is discussed on page 4-25 and in Appendix C pages C-1 thru C-5.

is just a Model and is based on the idea that you can take a limited amount of information and push a Timber sale through and then see if you have caused too much damage or not.

As to Sediment the DEIS basically ignores that 2/3 of the drainage is in British Columbia, The Canadians are much less restrictive and environmentally conscious than we are. By not dealing with the amount of Sediment being added to the Moyie River from Canada you are not dealing with the cumulative effects. C

You noted that the Moyie River Dam is a Sediment Trap and flushing the dam creates environmental problems - Therefore any additional Sediment caused by logging Activities would have negative impact.

No Mention was Made of the 3mile water District or the City of Moyie Springs. Both of these get water directly from the River below the Moyie River Dam. D During the spring Runoff when water is going over the spillway, of the dam, These water systems are effected. Any increase in sediment should be avoided [illegible]

BOUNDARY BACKPACKERS (continued)

C The **existing conditions of the Moyie River** are described on pages 3-15 thru 3-17. **Cumulative effects to the river** are shown on page 4-26 and Appendix C page C-6.

D The **Three Mile and City of Moyle water systems** have been added to the discussion on page 3-17 of the Final EIS.

According to IDF&G, the Moyie River still has Native cutthroat, no Mention was Made of this fishery and what needs to be done to protect IT and enhance IT E

Side Hill Trail 415 will be greatly impacted with Many of the cutting UNITS all logging needs to be done in a Manner that improves the trail and Maintains a Similar expirence for the hiker - extensive work needs to be done on this Trail to bring it up to a higher standard. H

The USFS has Again approached an EIS with the attitude of what is the Minimum we have to do to have a Timber Sale, rather than looking at a comprehensive Management of all aspects of the forest. the forest is not just a crop of Trees to be exploited for the logging & Milling Special interest groups.

The Visuals of the Moyie River are critical for the local resident. and the recreational user. Extreme Care needs

BOUNDARY BACKPACKERS (continued)

E **Management Indicator Fish Species** for the West Moyie area is identified on page 3-18. Effects are shown on pages 2-45, 4-27, and Appendix C page C-9.

H **Individual trails** are identified and discussed on page 3-76. Impacts are discussed on pages 4-163 thru 4-175.

I **Visual Impact to the Moyie River area** - see comment A

to be Taken to do a Timber Sale that will stand out a an example of forest Management practices of The future — not The Past —

David W Bodner
Boundary Backpackers

RECEIVED

SEP 11 1990

Box 8787
Moscow, ID 83843
6 September 1990

Gary Rahm
Bonners Ferry Ranger Dist.
Rt. 4 Box 4860
Bonners Ferry, ID 83805

Dear Mr. Rahm:

Having carefully read the draft EIS for the proposed West Moyie timber sales, I wish to make these comments on behalf of the Idaho Environmental Council:

1. Wilderness values. In light of recent court decisions, it is clear that it is this document, *not* the Forest Plan, that is making the final wilderness allocation decision for the Forest Service. It fails to do an adequate job. It lacks, for example, full economic data on resource tradeoffs. Indeed, the very small economic "analysis" that is appended, is purely a timber analysis. Natural values to be foregone have not been accounted for, nor has the loss of natural, unroaded recreation values--a scarce commodity near Bonners Ferry. Virtually none of the full accounting required in the Calif. v. Block decision appears here. A

2. Land suitablity. This document apparently assumes that the suitability decisions made rather broadly in the Forest Plan were accurate. Except for a risky decision to log (by helicopter) in an area the plan termed "unsuitable", there is no evidence in your document that a serious, scholarly, and site-specific look was made during this planning to see if the lands to be logged were really suitable. The law requires such an effort, as does common sense and good forest management. B

3. Net public benefits. You are required by law to maximize net public benefits during your planning. While there is lots of evidence that *private* benefits will be enhanced, there is no evidence of how the public will benefit. In fact, it looks like the public will lose. Elk habitat potential will decline, a significant loss to the already small trail system will occur, and water quality will decline. How were these clear public losses quantified? C

4. Sediment. It appears that there is a good chance that Forest Plan sediment standards will be exceeded. Since they were almost pathetically low to start with, is this a good idea. Is this even legal? D

5. Trails. Can't a way be found to reduce the loss of trails? Is it truly necessary to parallel most trails with a road and to cross them with skid trails? E

6. Riparian zone logging. Virtually all the development-oriented alternatives plan extensive, almost wholesale logging (some by even-aged methods) in the riparian zone. It is doubtful that this is lawful, and it certainly increases the impact of logging on streams leading to the sediment problems described above. It is also unclear that this logging H

IDAHO ENVIRONMENTAL COUNCIL

A **Wilderness allocation alternative** is discussed on page 2-38 and Appendix E pages E-1 and E-2. **Cumulative effects to roadless values in the Bonners Ferry area** have been added to the Final EIS pages 4-3 thru 4-8.

B See page 2-1 for discussion of **field verification between the Draft and Final EIS**, reconnaisance notes are in the project file. Additional information is contained in Chapter 3 pages 3-65, and Chapter 4 page 4-153.

C **Net Public Benefits** are discussed in Chapter 5 page 5-6.

D **Sediment yield increases and their effects on beneficial downstream uses** are shown in Chapter 4 pages 4-27 and 4-28 and Appendix C pages C-1 thru C-8.

E **Recreation management** within Forest Plan Management Areas common to the West Moyie area is shown under IPNF Forest Plan guidelines on page 3-78 and 3-79. See Chapter 4 page 4-164 for **Impacts to the trail system.**

H **Amount of riparian logging by alternative**, is identified in alternative descriptions pages 2-11 thru 2-34. **Application of State of Idaho BMPs** are discussed on page 2-7 and Appendix C practices 14.06, 14.17 and 15.12.

meets full Idaho BMP standards, let alone any site-specific goals that citizens may develop for the Moyie system. It is also bad forestry. Some development alternative that avoids this vast riparian zone logging needs to be considered, and perhaps even adopted.

7. Uncommon species. It is clear that the level of development planned here will have a major, and harmful impact on two uncommon species--boreal owls and goshawks. Neither is "endangered" in Idaho, but then the spotted owl was not endangered in wet side forests either until all the trees started to get chopped down. It seems that sound principles of wildlife management would require you to prevent actions leading to harm for these species. A proactive plan for their retention in place needs consideration. Your planning for West Moyie is silent on this issue, and trouble lies ahead as a consequence. I

8. Mitigation. Citizen concerns--and sound ones at that--for high quality mitigation planning, are described at page 2-22 in the draft EIS. It is wholly unclear which of these were actually adopted, and for which alternatives. There is no one section on "mitigation", nor does that phrase appear in the index--in fact, there *is* no index. Occasionally, something like mention of mitigation does appear (in the descriptions of Alt. I, for example), but that's simply not adequate. A full chapter on mitigation needs to be added, along with an explanation of why citizen-proposed mitigation measures are, or are not, being met. J

9. Transportation. The EIS lacks a clear, cohesive explanation of transportation planning, road standards, road closure plans, etc. It needs one. Open roads pose grave risks to wildlife, and machine use of roads solely intended for short-term log haul traffic, can help needlessly increase sedimentation. The chances that good transportation planning could help to reduce noise impact on people and animals has also been missed. K

In summary, it appears to me that this EIS plans extensive logging in a potential wilderness without fully disclosing the likely impacts, and even worse, without making much of an effort to mitigate the harm to be done. This does not add up to very good forest planning. IEC believes that a revised draft is needed to cure these problems.

Sincerely,

IDAHO ENVIRONMETAL COUNCIL

Den Baird

Dennis W. Baird
Vice-President.

IDAHO ENVIRONMENTAL COUNCIL (continued)

I These **wildlife species** are discussed in Chapter 3 pages 3-34 thru 3-36 and 3-38 thru 3-40. Effects of the alternatives on these species are displayed on pages 4-104 thru 4-115 and compared on pages 2-52 and 2-53.

J **Objectives identified thru public involvement**, shown on page 2-24 of the Final EIS, were incorporated into the Draft EIS Preferred Alternatives, as discussed in the Final EIS pages 2-25 thru 2-30. Additional **mitigation measures** are discussed in alternative descriptions, pages 2-11 thru 2-34 and Features Common to All Alternatives, pages 2-7 thru 2-11.

K Features Common to All Alternatives identifies **road management and design** page 2-7. Alternative maps accompanying the FEIS identify locations of road closures. See alternative descriptions pages 2-22 thru 2-25 (for Alternative I and objectives for Alternatives J1, J2, J2H.)

INLAND EMPIRE PUBLIC LANDS COUNCIL

Forest Watch Program

HCR5 Box 110, Priest River, ID 83856 · W. 315 Mission, Spokane, WA 99201
(208) 443-2529 (Home) · (509) 327-1699 (Office)

September 6, 1990

Gary N. Rahm, District Ranger
Bonners Ferry Ranger District
Route 4, Box 4860
Bonners Ferry, Idaho 83805

Dear Mr. Rahm,

I welcome the opportunity to comment on the West Moyie Draft Environmental Impact Statement (DEIS). A 45 day comment period does not provide enough time to properly analyze a document of such broad scope. Because of this, my comments will be limited to a preliminary water quality analysis. I reserve the right to raise issues in my response to the Decision Notice that I have not covered in my preliminary analysis.

I commend you on the high quality of the maps presented throughout the DEIS. Although these maps are a great improvement over the barely legible maps usually found in an EA or an EIS, the Alternative maps and those representing the drainages and subdrainages should be topographical since aspect and elevation are important factors which effect water quality. A

Your inclusion of a map of previously harvested acres is welcome, but it would have been more effective if the previously harvested units were included on all of the maps of the various alternatives. This would enhance the public's comprehension of the actions which you propose.

The timing and size of each individual timber sale within the decision area should be fully discussed in the DEIS. B A separate Environmental Assessment should also be produced for each of the proposed sales. C

The cumulative effects analysis is not comprehensive. Although the DEIS mentions that logging and roading activities in the Canadian section of the Moyie River are significant contributors to water quality degradation, the analysis fails to factor these effects in the water quality and fishery analysis. D The DEIS mentions that there will be other timber sales and road

Recycled Paper

INLAND EMPIRE PUBLIC LANDS COUNCIL (9/6/90)

A The interdisciplinary team discussed the **use of topographic maps**, but decided that they would be confusing and contain so much detail that they would in effect lose clarity for most viewers. Topo maps are included in the project file and are available upon request. Likewise, the ID team felt that a map of each alternative showing the previous harvesting would be difficult to clearly understand.

B The **timing and size of each proposed sale** is identified in Appendix A pages A-5 thru A-21.

C **Preparing a separate Environmental Assessment for each proposed sale** is discussed in Chapter 5 page 5-6.

D The **condition of the Moyie River** is discussed in Chapter 3 pages 3-15 thru 3-17. Cumulative effects are discussed in Chapter 4 pages 4-26 and 4-27.

building activities in the Moyie River drainage plus pipeline construction along the River's bank. The lack of quantitative estimates of the effects of the aforementioned actions distorts the real water quality situation of the affected area.

The DEIS does not fully consider the effect of dumping accumulated sediment from the Moyie River into the Kootenai River. This will be an ongoing activity due to the fact that further sediment will be accumulated as a result of current and proposed activities. E

The DEIS also fails to address the effects on the Three Mile and City of Moyie Springs domestic water systems. F

The reliance on water quality models over extensive ground truthing is unprofessional. "Indicators to assess the impacts of the proposed action and alternatives on fisheries streams (non-consumptive), will be sediment yield over base (using R1R4 model) and fry emergence" (Draft EIS, Chapter 2-3). Professionals readily agree that models are to be used as indicators displaying the relative differences between alternatives and should be used in conjunction with extensive ground truthing.

This is especially true of the Fry Emergence guidelines. They are based upon the IPNF sediment model whose weaknesses are discussed throughout the EIS, and sediment sampling employing the box sieve technique which greatly underestimates the amount of sediment found in the streams. G

The figures given for the models need to be put in perspective. For instance, what can be expected to occur in a stream when the R1R4 states that sedimentation is 35% over base? These figures are meaningless to the public until they are given an explanation as to their significance.

Some fish population numbers and species composition are provided in the DEIS. What is the significance of those numbers?

Further analysis was conducted on Hellroaring Creek because the models indicate that Fry Emergence Success (FES) is below Forest Service (FS) standards. The Forest Hydrologist discredits the IPNF sediment model upon which the FES is based and relies on the R1R4 model as a basis for his conclusion that "Current suspended sediment increases from roading an harvest are probably not degrading water quality"(DEIS, C-8). I would like a more detailed explanation of how he arrived at that conclusion. H

He concedes that there is a bedload and stream stability problem. The DEIS mentions that the stream channel stability has been degraded to a poor condition as a result of recent logging activities in that drainage. It is surprising that the Hydrologist does not recommend against further logging and road

INLAND EMPIRE PUBLIC LANDS COUNCIL (9/6/90 continued)

E **Sediment added to the Moyie River** is discussed in Chapter 2 page 2-1, Chapter 4 page 4-27, and Appendix C pages C-5 and C-6.

F The **Three Mile and City of Moyie water systems** are discussed in Chapter 3 page 3-17. With the new developments, there would be no impact to the systems.

G **Water resource ground truthing for the Moyie River and tributary streams** is identified in Chapter 3 pages 3-15, 3-17 thru 3-20, Chapter 4 page 4-26, and Appendix C pages C-1 thru C-7.

Chapter 4 pages 4-27 and 4-28 as well as Chapter 2 page 2-45 discuss the meaning of values relative to **stream channels**.

H For additional information on **hydrologist's conclusions**, see the description of **Hellroaring Creek** which has been corrected between the Draft and Final EIS. It now better reflects the ground truthing and hydrologist's recommendations. Chapter 3 pages 3-19 and 3-20, Chapter 4 page 4-20 discuss establishment of thresholds to protect Hellroaring Creek.

Chapter 4 page 4-27 summarizes the effects of the alternatives on this stream. See also Appendix C pages C-1 thru C-3 and C-7. They can be briefly summarized that conclusions were based on ground truthing, studies, geology, and computerized modeling.

building until the stream has a chance to recover. Further logging and road building will continue to degrade Hellroaring Creek and will impact Round Prarie Creek which is an important fishery stream. H

The DEIS does not provide adequate site specific fishery habitat analysis. There is not any detailed discussion of pool/riffle ratios or overwintering habitat. A discussion of the bedload condition of all affected streams should have been included in the DEIS. I

Another omission in regards to fisheries is the lack of a fish indicator species. The DEIS also fails to address how the preferred alternatives will affect the fish population targets set for Round Prarie and Hellroaring Creeks. J I

The DEIS mentions the use of the State of Idaho's proposed turbidity criteria. To be consistent it should have discussed dissolved oxygen, and stream temperatures which also affect fishery survival. J

The preferred alternatives will continue to contribute further suspended and bedload sediment to the Moyie River system. These will accumulate and add to the problem of a river whose fishery habitat has already been impacted by previous and current activities. It is commendable that the Bonners Ferry Ranger District is undertaking a rehabilitation program in order to improve fish habitat in the River. To create fish habitat while proposing activities which will contribute to the continued degradation of that habitat makes no sense. A comprehensive rehabilitation program should include deferment of any further logging and roading until the damaged watersheds are allowed to recover. K

Such would be the case if the No Action Alternative was selected. This alternative should have been given much more consideration especially since this sale has the very strong potential to reduce water quality, fishery habitat and populations, destroy scenic vistas by harvesting in critical viewsheds, reduce wildlife habitat and populations, severely impact recreation experience by proposing logging units and roads adjacent to and across established hiking trails, and forgo the area's consideration for wilderness designation.

The justification for the diminishment of the aforementioned resources is to capture timber threatened by "potential" disease and bug infestations, and to supply the timber industry with raw materials. The proposed action alternatives are timber driven and logging activities take precedence over the other resources found within the forest.

In order to conduct a further analysis of the DEIS I am requesting the following information: L

1. A copy of the R1R4 WATBAL computer printouts which includes the input data for the preferred alternatives.

INLAND EMPIRE PUBLIC LANDS COUNCIL (9/6/90 continued)

I **Fishery habitat analysis process and effects** are shown in Chapter 4 page 4-27 and Appendix C pages C-4, C-5, and C-9 thru C-12.

J **Fish Management Indicator Species** is identified in Chapter 3 page 3-18. Criteria to determine the **effects on fish habitat** is identified in Chapter 2 pages 2-3 and Appendix C pages C-4 and C-5.

K **Condition of the Moyle River** is updated in the discussion in Chapter 3 pages 3-15 thru 3-17. Effects of the alternatives are shown in Chapter 4 pages 4-26 and 4-27. Also see Appendix C pages C-4 thru C-6.

L Information supplied as requested, September 17, 1990.

2. A copy of the worksheets which were used to determine the IPNF Sediment model figures and the worksheets which use those figures to determine Fry Emergence Success for all the drainages as presented in the preferred alternatives.

Thank you for providing me an opportunity to comment on the West Moyie DEIS.

Sincerely,

Barry Rosenberg

Barry Rosenberg, Forest Watch Coordinator

cc: John Osborn
David Siebenthaler
David Bodner
Charles Sheroke

ROW RIVER ODYSSEYS WEST

REC'D BFRD SEP 10 1990

September 6, 1990

Gary Rahm
District Ranger
Bonners Ferry R.D.
Rt 4 Box 4860
Bonners Ferry ID 83805

Dear Mr. Rahm:

I am writing to comment on the West Moyie Draft Environmental Impact Statement.

I run a rafting company that has been conducting whitewater trips on the Moyie since 1981.

In your summary you state that "Recreation use is primarily hunting, hiking and trailriding, both horseback and motorcyle, on the trail system; fuel gathering; camping; berry picking; and driving for pleasure." You have completely omitted any mention of river floating by kayak, raft, canoe and tube. Our company alone takes over 450 people each year on the Moyie river. There is at least one other outfitter who takes a significant number of people on the Moyie. And then there are easily another 1000 people who float the river on their own during the high water whitewater season from April to early July. Then, there are countless people who float on tubes and in canoes during the summer months. This use could be dramatically affected, especially by the visual impact of any logging and road building in the West Moyie area and you have not considered this use group at all. A

My concerns are as follows:

1) Water quality on the Moyie is already compromised by poor watershed conditions. This is clear after heavy rains which muddy the river greatly. Compared to watersheds such as the St. Joe and Middle Fork of the Salmon for example, this particulate polution is significant. I would ask that water quality protection be high among your considerations. And that provisions for mitigation of any damage done be included. Slopes of great gradient directly draining into the Moyie river should not be logged. B

P.O. BOX 579 • COEUR D'ALENE, ID 83814 • (208) 765-0841

RIVER ODYSSEYS WEST

A **Recreational use of the Moyie River** is discussed in Chapter 3 page 3-10 and 3-81. **Visual sensitivity** of the river is included on pages 3-21 and 3-24. **Visual impacts** of the various alternatives are displayed in Chapter 4 pages 4-68 thru 4-103 and compared in Chapter 2, pages 2-47 thru 2-52.

B **Existing condition of the Moyie River** is described in Chapter 3 pages 3-15 thru 3-17. Chapter 2 page 2-7 and Soil and Water Conservation Practices discussed in Appendix C identify **mitigation measures that would be applied to protect water quality.**

Chapter 4 pages 4-26 and 4-27 summarize the **effects of the alternatives on water quality.**

2) Visual impact. Looking up from the river to clear cuts, roads and a disturbed forest is an impact that is concrete and must be reckoned with. A

3) Safety while travelling on Meadow Creek road. Logging trucks have a reputation for speed and time limits. This use and recreation use are not compatible. A bus full of people is a dangerous target for a speeding logging truck. C

I ask that the above concerns be addressed.

Thank you for the opportunity to comment.

Sincerely,

Peter Grubb
owner

RIVER ODYSSEYS WEST (continued)

C See chapter 5 pages 5-4 and 5-5 for a discussion of the **Meadow Creek Road**.

SEP 1 0 1990

Northern Idaho Audubon Society
P.O. Box 3028
Bonners Ferry, Idaho 83805

10, September 1990

BONNERS FERRY RANGER DISTRICT
ROUTE 4, BOX 4860
BONNERS FERRY, IDAHO 83805

TO DISTRICT RANGER,

WE APPRECIATE THE TIME AND EFFORT THAT HAS BEEN SPENT ON THE WEST MOYIE DRAFT E.I.S. IT WOULD BE IMPOSSIBLE FOR US TO COMMENT ON ALL ASPECTS OF THIS DOCUMENT. AT THIS TIME. WE WOULD LIKE TO RESERVE THE RIGHT TO COMMENT ON CONCERNS THAT ARE NOT COVERED IN THIS RESPONSE FOR A TIME APPROPRIATE TO THE FINAL E.I.S.

THE ISSUES AND CONCERNS WE WOULD LIKE TO ADDRESS AT THIS TIME ARE AS FOLLOWS:

THE FIRST IS AN ASSUMPTION FOUND IN THE DOCUMENTS' STATED PURPOSE AND NEED, "TO DISCLOSE EFFECTS OF THE PROPOSED TIMBER HARVESTING." THIS ASSUMPTION IS THE BASIS FOR THE ENTIRE DOCUMENT AND AS SUCH, DESPITE ALL THE TALK ABOUT NEW PERSPECTIVES WITHIN THE FOREST SERVICE, SEEMS CONTRARY TO THE MANDATE OF MULTIPLE USE MANAGEMENT. ALL ACTION ALTERNATIVES ARE DRIVEN BY TIMBER HARVEST - NONE ARE DRIVEN, FOR EXAMPLE, BY OLD GROWTH AND BIO-DIVERSITY NEEDS, OR RECREATION ENHANCEMENT, OR FISHERIES IMPROVEMENT. A

SECOND IS AN ASSUMPTION THAT GOES HAND IN HAND WITH THE FIRST. THIS IS AN ATTITUDE THAT RESOURCES, OTHER THAN TIMBER CAN BE MANAGED FOR MINIMUMS AND WHEN IN DOUBT ASSUME THE RESOURCE WILL NOT BE HARMED BY TIMBER HARVEST. THIS 'DEATH BY A THOUSAND CUTS' IS SLOWLY DESTROYING OUR BIO-DIVERSITY, OUR WILDLIFE, OUR TRAIL SYSTEMS AND OUR FISHERIES.

THIRD IS OUR CONCERN ABOUT COMPUTER MODELS. IT APPEARS THAT MANY OF THE MODELS HAVE NOT BEEN VALIDATED IN THE REAL WORLD. BY THE FOREST SERVICES' OWN LITERATURE, COMPUTER MODELS ARE MERELY PREDICTIONS AND REQUIRE DOCUMENTED MONITORING IN THE REAL WORLD TO FIND OUT WHAT IS REALLY HAPPENING. THIS IS CLEARLY ILLUSTRATED IN THE CHAPTER ON WATER QUALITY WHERE SEDIMENT MODELS ARE A PICK AND CHOOSE OPERATION AND YOU NEVER REALLY ANSWER THE QUESTION - HOW ARE THE FISH DOING? FURTHERMORE, TO HAVE ANY VALID APPLICATION TO ON THE GROUND CONDITIONS AND ACTIVITIES, ALL COMPUTER MODELS MUST INCLUDE A % OF ERROR FACTOR. B

CUMULATIVE EFFECTS ARE NOT DEALT WITH SUFFICIENTLY. THIS DOCUMENT DEALS WITH ONLY 4% OF THE MOYIE DRAINAGE AND DETAILS WHAT WILL NOT CONTRIBUTE TO CUMULATIVE EFFECTS. WHAT C

NORTH IDAHO AUDUBON SOCIETY

A The **purpose and need for the proposed action** is identified in Chapter 1 page 1-1. The **National Forest planning process** is discussed in Chapter 1 page 1-3.

B Chapter 4, pages 4-24 and 4-27, as well as Chapter 2 page 2-45 discuss the meaning of figures as related to **stream channels and fish habitat.** Also see Appendix C pages C-4 and C-5 for analysis process and effects.

C An updated **existing condition of the Moyle River** is shown in Chapter 3 pages 3-15 thru 3-17 and Chapter 4 pages 4-26 and 4-27 outline the effects the alternatives would have on the river. Also see Appendix C page C-6.

WILL CONTRIBUTE TO CUMULATIVE EFFECTS, IS INADEQUATELY IDENTIFIED. THE ACTUAL ENVIRONMENTAL IMPACT OF ACTIVITIES ON ADJACENT LANDS TO THE DECISION AREA WAS NOT ADDRESSED AT ALL. ALSO, THE ENVIRONMENTAL IMPACT OF ACTIVITIES WITHIN THE DECISION AREA ON ADJACENT LANDS WAS SIMILARILY NOT ADDRESSED.

HOW WILL THIS PROPOSAL EFFECT THE POSSIBLE FUTURE CONSIDERATION OF THE MOYIE RIVER FOR WILD AND SCENIC DESIGNATION?

THE WATER ANALYSIS IS VERY CONTRADICTORY. UPPER MEADOW CR. IS IN NEAR PRISTINE CONDITION SHOWING A 79% FRY EMERGENCE, WHILE HELLROARING CR., IN A SEVERELY DEGRADED STATE, SHOWS 80% FRY EMERGENCE. THIS TYPE OF ANALYSIS SIMPLY MAKES NO SENSE.FURTHER, THE % INCREASE IN PEAK FLOW THRESHOLD APPEARS TO BE A BLATANT ATTEMPT TO JUSTIFY EFFECTS OF TIMBER HARVEST ACTIVITY. THIS CONCEPT IS MISLEADING AND NOT SSUBSTANTIATED BY EFFECTS OF PAST TIMBER HARVEST ACTIVITIES...STREAMS DO SURVIVE, BUT IN A DEGRADED CONDITION ALONG WITH LOSS OF QUALITY FISHERIES, WILDLIFE HABITAT AND GENERAL FOREST HEALTH. THE ONLY BENEFICIARY OF THE IMPLEMENTATION OF THESE CONCEPTS IS RATIONALIZATION FOR CUTTING TREES.

THERE ARE BLATANT INCONSISTENCIES IN THE VISUAL QUALITY ANALYSIS; BACKGROUND VIEWS OF SIDEHILL CLEARCUTS ARE NOT CONSIDERED DOMINANT, REGARDING RECREATION AND TRAIL USE; SIDEHILL CLEARCUTS IN BACKGROUND VISUAL QUALITY ANALYSIS ARE CONSIDERED DOMINANT, GIVING RISE TO RATIONALIZATION FOR VISUALLY SOFTENING HARVEST PRESCRIPTIONS. ONCE AGAIN. TIMBER HARVEST CONCERNS ARE GIVEN PRIORITY OVER OTHER RESOURCES.

FINALLY, N.I.A.S IS STRONGLY OPPOSED TO TIMBER HARVEST IN ANY RIPARIAN ZONE AND FINDS ENTRY INTO ANY ROADLESS AREA. FOR THE PURPOSE OF TIMBER HARVEST. TO BE UNWISE AT THIS TIME.

THANK YOU.

David B. Siebanthaler

David B. Siebanthaler
President, N.I.A.S

D

E

H

NORTH IDAHO AUDUBON SOCIETY (continued)

D The **Moyie River Wild and Scenic Rivers Study** completed in 1978 is discussed in Chapter 3 page 3-16.

E **The condition of these drainages** is described in Chapter 3 pages 3-18 thru 3-20. Chapter 4 pages 4-25 and 4-26 and Appendix C page C-1 thru C-5 and C-8 discuss the **IPNF Sediment Model** and its usefullness. Also identified on page C-8 is a more reliable method of measuring effects. Chapter 4 pages 4-24 and 4-25 as well as Chapter 2 page 2-45 discuss the meaning of modeling predictions.

H Chapter 3 page 3-21 discusses the establishment of **sensitivity levels for viewpoints** to enable the development of Visual Quality Objectives (VQO's). VQO's and their application are discussed on page 3-26. Need for visual resource rehabilitation is discussed on page 3-30.

W-I FOREST PRODUCTS, L.P.

RECD
SEP 12 1990

Bonners Ferry Division
P.O. Box 897
Bonners Ferry, ID 83805
(208) 267-3161

September 12, 1990

Gary Rahm, District Ranger
Bonners Ferry Ranger District
Route 4 Box 4860
Bonners Ferry, ID 83805

Gary:

I would like to express my appreciation for you allowing me additional time to comment on the West Moyie Environmental Impact Statement. I understand that you may not be able to incorporate this comment into the record.

I believe that the EIS Team has done an excellent job of preparing this document and I give a lot of credit to Mark Grant, team leader.

I strongly support Alternative J2 and hope that you will choose it and include the helicopter option with it. This combination most closely matches the Forest Plan predicted volumes for the area while meeting other objectives. In fact I believe it may even exceed Forest Plan predictions. I have stated many times that I do not know if the helicopter option will be able to work out economically and that I hope the helicopter option becomes a separate sale rather than be a liability to an otherwise economical sale. However, I believe that the right way to go in this situation is to put up helicopter logging sales and let the industry decide if we can make it work. A

I do have three minor concerns with the way the process went. First, there was quite a bit of discussion about actions that would have required modifying the Forest Plan. I do not believe that the objective of project level analysis is to rewrite the Forest Plan. B

Second, there is some discussion in the EIS about old growth having been cut with the Hellroaring timber sales and that maybe is why the percent of old growth is low. In reality, none of the recent previous sales in this area cut any old growth. C

W-I FOREST PRODUCTS, L.P.

A **Sale scheduling and timing** are identified in Appendix A pages A-5 thru A-21.

B **Purpose of this level of planning** is discussed in Chapter 1 pages 1-3. Possible **Changes in winter range management area allocations** are discussed for Alternative I, page 4-134. Ground truthing of suitability is discussed in Chapter 4 page 4-153.

C Chapter 2 page 2-52 states that past timber harvest and wildfires (above the 5000 foot elevation) have reduced **nesting habitat for boreal owls**. This refers to mature spruce-fir timber stands, as well as old-growth forest. Chapter 4 pages 4-108 and 4-109 discuss habitat prior to the harvesting which started in the 1960's.

And finally, I am concerned about the high cost of preparing such a document. Other than perhaps finding ways to streamline the process, I know neither you nor I can solve this problem but it still concerns me.

In closing, I would again like to thank you for your patience and I promise to be more timely in the future.

Thank you,

W-I FOREST PRODUCTS, L.P.

Ken Carter

Ken Carter
Forester

KC/mkl

United States Environmental Protection Agency

Region 10
1200 Sixth Avenue
Seattle WA 98101

Alaska
Idaho
Oregon
Washington

EPA

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SEP 1 1990

REPLY TO ATTN OF: WD-136

Gary N. Rahm
District Ranger
Bonners Ferry Ranger District
Route 4, Box 4860
Bonners Ferry, Idaho 83805

Dear Mr. Rahm:

The Environmental Protection Agency (EPA) has reviewed the draft environmental impact statement (EIS) for the **West Moyie Timber Sale, Idaho Panhandle National Forests, Bonners Ferry Ranger District**. The draft EIS evaluates nine alternatives for managing the West Moyie decision area. Our review was conducted in accordance with the National Environmental Policy Act (NEPA) and our responsibilities under § 309 of the Clean Air Act.

The preferred alternatives J1, J2, and J2H were developed in response to public comment during the scoping process. These alternatives represent a moderate volume of timber harvest, or a high volume if helicopter harvesting is used, for habitat management and for treatment of disease and insect conditions. The volume of timber to be harvested in the eight action alternatives varies from 6.1 to 19.9 MMBF.

The district has done a good job of providing an environmental document that is easily understood. The objectives of the project are clearly stated and the interdisciplinary team (IDT) analysis of the environmental issues and how the alternatives meet the project purposes are thoroughly discussed. We especially endorse the user "guides" which help the public review the EIS.

On the basis of our review, we are rating this draft EIS EC-2 (Environmental Concerns - Insufficient Information). Our environmental concerns are based on the potential for adverse effects to water quality and fisheries if the monitoring plan does not detect adverse effects. We are requesting additional information on the proposed monitoring plan.

Additional detail is needed on the types of surveys, location and frequency of sampling, parameters to be monitored, indicator species, budget, procedures for using the monitoring data in plan implementation, and the availability of monitoring results to interested and affected parties. How will the sale administrator inspection reports be used to affect future management of this area? A

US ENVIRONMENTAL PROTECTION AGENCY

A The **Monitoring Plan**, Chapter 2 pages 2-35 thru 2-37, has been rewritten to more accurately reflect the water quality monitoring plans. The BMP monitoring feedback process is defined in Appendix C.

The sections on **water quality** have been rewritten to emphasize the most important effects of implementing the alternatives relative to maintaining beneficial uses. This includes correcting Chapter 3 descriptions of the existing conditions and historic occurances within the Moyie River drainages.

See pages 2-45 thru 2-47 Comparison of Alternatives, pages 3-12 thru 3-20, pages 4-24 thru 4-67 and Appendix C in its entirety to support our finding of no adverse impact to water quality/fisheries habitat for all alternatives except Alternative B2.

We appreciate the opportunity to review this draft EIS. If you have any questions about our review comments you may contact Sally Brough in the Environmental Review Section at (206) 442-4012.

Sincerely,

for

Ronald A. Lee, Chief
Environmental Evaluation Branch

IDAHO FISH & GAME
REGION 1
2320 Government Way
Coeur d'Alene, ID 83814
(208) 785-3111

JAN 14 1991

January 11, 1991

all routed

Mr. Gary Rahm, District Ranger
Bonners Ferry Ranger District
Route 4 Box 4860
Bonners Ferry, ID 83805-9764

Dear Gary:

REFERENCE: WEST MOYIE DEIS

After meeting with your staff in October, we believe our concerns about white-tailed deer winter range in areas below 3,000 feet elevation can be addressed. We suggest site-specific field review to determine deer use areas. Timber harvest prescriptions for the areas deer use should leave 90% of the existing overstory cover intact. A

The field trip with your staff to the Hell Roaring drainage in December afforded an excellent opportunity to view the impacts of previous timber harvest on elk habitat potential. We realize the West Moyie DEIS decision area does not have elk management guidelines under the current forest plan. We believe the elk herd in the area is growing and that it provides considerable economic benefit to the surrounding communities. We suggest that elk management guidelines for the area be incorporated into the next forest plan revision.

Previously harvested stands in the Hell Roaring drainage have not recovered sufficiently to provide hiding or thermal cover for elk. If proposed harvest plans are implemented there will be little suitable elk cover in most of the drainage and little opportunity to establish a viable elk management unit during the next thirty years. We recommend timber harvest in Hell Roaring drainage be deferred until previously logged areas have recovered (at least ten years).

Many of the logging prescriptions proposed in the DEIS are in response to "high risk" stand conditions due to age, insects or disease. From a strictly silvicultural perspective, this may make good sense. However, stands that are silviculturally at risk can be valuable wildlife habitat. For example, prescriptions designed to raise stand temperatures to help control insect infestations, (etc.) will not be beneficial to elk that sought those stands as thermal cover. Marten will be adversely affected by loss of habitat and increased vulnerability to trapping because of more road access.

B

Cecil D. Andrus / Governor
Jerry M. Conley / Director

IDAHO DEPARTMENT OF FISH & GAME

A The areas most used for **white-tailed deer winter range** are identified in Chapter 3 page 3-42. Chapter 4 pages 4-129 thru 4-137 disclose the effects of the alternatives on these stands.

B Increasing the closure period of this road would be an administrative decision that would fit with any alternative, including No Action.

If you decide to harvest more timber in the Hell Roaring drainage now, we recommend the road system into Little Hell Roaring drainage be closed during the deer and elk hunting seasons (late August through December). We suggest the road closure begin at the junction of forest roads 2485 and 2266. Security and thermal cover will decrease if more timber is harvested now. We suggest that crucial elk habitat components be identified and protected during sale design and administration. Thermal cover areas are especially important. B

We appreciate the opportunity to work with your staff on this project. Please contact Ed Bottum at this office if we can be of further assistance.

Sincerely,

Dave

David W. Ortmann
Regional Supervisor

DWO:CEB:kh

C: Greg Johnson
Bureau of Wildlife
Bureau of Program Coordination

LIST OF PREPARERS

LIST OF PREPARERS

The following list includes all the individuals who contributed to the preparation of the DRAFT and FINAL Environmental Impact Statement. An asterisk (*) following a name indicates that the individual no longer holds the noted position.

Abbreviations:
- BA - Bachelor of Arts
- BS - Bachelor of Science
- MS - Master of Science
- JD - Doctor of Juris Prudence
- AA - Associate Degree

Name: Area of Expertise	Education	Yrs Experience
INTERDISCIPLINARY PLANNING TEAM		
Mark Grant: Team Leader/ Frsty Tech/Visual Resource Tech	AA Forest Technology	17
Bob Bosworth: Silviculturist	MF Master of Forestry	29
Bret Christensen: Wildlife Biologist*	BS Wildlife Biology	6
Michael Collette: Hydrologist*	BS Forest Watershed Mngmt.	15
Jack Filipowski: Transportation Planning	BS Engineering	19
Chris Jacobson: Forester*	BS Forestry	10
Bob Klarich: Resource Forester	BA Forestry	12
Maridel Merritt: Graphics/Layout Editor/Art	BS Animal Industries	15
Craig Norris: Wildlife Biologist*	BS Biology	6
Paul Sieracki: Wildlife Biologist*	BS Zoology	8
Mary Water: Soil Scientist*	BS Soil Science	3
Tom Ball: Forester*	BS Forest Biology	14
Dave Asleson: Forester/Silviculturist	MS Forestry	18
Dave Roberts: Wildlife Biologist*	BS Wildlife Biology	13
ADMINISTRATION		
Gary N. Rahm: District Ranger	BS Forestry/Hydrology	24
Debbie Henderson-Norton: Deputy District Ranger	BS Forest Mngmt.	11
Allen B. Chrisman: Timber Mgmt Asst*	MS Forestry	14
Sandra Jacobson: Wildlife Biologist	BS Zoology MS Natural Resources	12
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GLOSSARY

*** A ***

Affected Environment. The natural, physical, and human-related environment that is sensitive to changes due to proposed actions.

Air Quality. Refers to standards for various classes of land as designated by the Clean Air Act, P.L. 88-206:Jan. 1988.

Airshed. A geographic area that, because of topography, meteorology, and climate, shares the same air.

Aluvial. Materials transported and deposited by water.

Alternative. A mix of management prescriptions applied to specific land areas to achieve a set of goals and objectives. The alternative provides management direction for the proposed project which reflects identified public and management concerns for the Decision Area.

Allowable Sale Quantity (ASQ). The quantity of timber that may be sold, from the area of suitable land covered by the Forest Plan, for a time period specified by the Plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity."

*** B ***

Basal Area. The area of the cross-section of a tree stem near the base, generally at breast height and inclusive of bark.

Best Management Practices (BMP's). Practices determined by the State to be the most effective and practical means of preventing or reducing the amount of water pollution generated by non point sources, to meet water quality goals.

Big Game. Those species of large mammals normally managed as a sport hunting resource.

Big Game Summer Range. A range, usually at higher elevation, used by deer and elk during the summer. Summer ranges are usually much more extensive than winter ranges.

Big Game Winter Range. A range, usually at lower elevation, used by migratory deer and elk during the winter months; more clearly defined and smaller than summer ranges.

Biological Evaluation. A documented Forest Service review of activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered, proposed, or sensitive species.

Board Foot (BF). The amount of wood equivalent to a piece of wood one foot by one inch thick.

Broadcast Burn. Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of a fuel hazard or as a silvicultural treatment, or both.

Browse. Twigs, leaves, and young shoots of trees and shrubs on which animals feed.

* C *

Canopy. The more-or-less continuous cover of branches and foliage formed collectively by the crown of adjacent trees.

Cavity. The excavated hollow in trees by birds or other natural phenomena; used for roosting and reproduction by many birds and mammals.

Cavity Excavator. An animal that constructs cavities in trees for nesting or roosting.

Chipping. The reduction of woody residue by a portable chipper to chips that are left to decay on the forest floor.

Clearcut. A harvest regeneration method under an even-aged silvicultural system in which the existing stand of trees is removed.

Climax. The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition over time and perpetuates itself unless disturbed by outside forces.

Climax Species. Those species that dominate a climax stand.

Commercial Thinning. Tree thinning that produces merchantable material at least equal in value to the direct costs of harvesting.

Compaction. The packing together of soil particles by forces exerted by forces at the soil surface, resulting in increased soil density.

Compartments. A geographic area delineated by a sub-watershed drainage for managment planning purposes.

Condition Class. A grouping of timber stands into size-age-stocking classes for Forest planning.

Cover. Vegetation used by wildlife for protection from predators or to modify the adverse effects of weather; or the reproduce.

Cover/opening ratio. The mixture of cover and forage areas on a unit of land, expressed as a ratio.

Cultural Resource. The remains of sites, structures, or objects used by humans in the past--historic or prehistoric.

Cumulative Effect. The impact on the environment which results from the incremental impact of the action when added to other actions. Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time.

* D *

Decision Area. The geographic area defining the scope of this document and the alternatives proposed by it.

Diameter at Breast Height (DBH). The diameter of a tree measured 4 feet 6 inches above the ground.

Displacement, Soil. The movement of the forest floor (litter, duff, and humas layers) and surface soil from one place to another by mechanical forces such as a blade used in piling and windrowing. Mixing of surface soil layers by disking, chopping, or bedding operation, is not considered displacement.

Duff. An organic surface soil layer below the litter layer in which the original form of plant and animal matter cannot be identified with the unaided eye.

* E *

Ecosystem. Any community of organisms along with its environment, forming an interacting system.

Ecotone. The boundary or transition zone between adjacent plant communities.

Effects (or impacts). Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

Endangered Species. Any plant or animal species which is in danger of extinction throughout all or a significant portion of its range. (Endangered Species Act of 1973).

Endemic. The population of potentially injurious plants, animals, or diseases that are at their normal, balances level, in contrast to epicemic.

Environment. The aggregate of physical, biological, economic, and social factors affecting organisms in an area.

Environmental Assessment (EA). A concise public document which serves to: (a) Briefly provide sufficient evidence and analysis for determining whether to prepare and EIS or a Finding of No Significant Impact; (b) Aid an agency's compliance with NEPA when no EIS is necessary; (c) Facilitate preparation of an EIS when necessary.

Environmental Impact Statement (EIS). A detailed statement prepared by the responsible official in which a major Federal action which significantly affects the quality of the human environment is described, alternatives to the proposed action provided, and effects analyzed.

Epidemic. The populations of plants, animals, and diseases that build-up often rapidly, to highly abnormal and generally injurious levels.

Equivalent Clearcut Acre (ECA). The effective size of a harvesting unit, related to the established crown cover of the unit before the practice and the magnitude of the practice itself. (Examples: (a) 100 acre unit with 100% removal = 100 ECA. (b) 100 acre unit with 50% cover and 50% removal = 25 ECA.)

Erosion. The detachment and transport of individual soil particles by wind, water, or gravity.

Even-Aged Management. The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Clearcut, shelterwood, or seedtree harvest methods produce even-aged stands.

Even-aged Stands. Stands in which all trees are of about the same age (A spread of 10 to 20 years is generally considered one age class).

*** F ***

Fauna. Animals, including lesser form such as insects, mites, etc.

Federal Candidate Taxa. A classification category for those threatened, endangered, and sensitive plants or animals listed in the Federal Register (Sept. 27, 1985), and other plants recommended for addtion to the Federal Candidate list.

Flora. Plants

Forage. All browse and nonwoody plants that are available to livestock or game animals and used for grazing or harvested for feeding.

Forb. An herbaceous plant that is not a graminoid.

Fuels. Combustible materials present in the forest which potentially contribute a significant fire hazard.

Fuel Treatment. Manipulation or reduction of natural or activity fuels (generated by a management activity, such as slash left from logging) to reduce fire hazard.

*** G ***

Genetic Seedlings. Tree seedlings from a genetically superior seed source. The seeds are collected from trees displaying exceptional form and raised in nurseries during outplanting. The seedlings usually have faster growth rates than naturally regenerated seedlings.

Graminoid. All grasses and grasslike plants, including sedges and rushes.

Group Selection. An uneven-aged silvicultural harvest system in which all trees in a small group are removed for regeneration purposes. The size of the group is small enough in area that all subsequent regeneration will be influenced by the surrounding uncut stand. Cuts are generally .25 - 2.0 acres in size.

Growing Season. That part of the year when temperature and moisture are favorable for vegetation growth.

*** H ***

Habitat. The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

Habitat type. An aggregation of all land areas potentially capable of producing similar plant communities at climax.

Hardwood. A broad-leaved tree.

High Risk. Individual or groups of trees that are live (green) but have the physical characteristics favorable to insect infestation or disease infections. Trees in this category are subject to mortality and loss of economic value.

*** I ***

Idaho Monitor Taxa. A classification of plants by the Idaho Native Plant Society that includes plants that are common within a limited range as well as those plant taxa which are uncommon, but have no identifiable threats to their survival (for example, certain alpine taxa).

Idaho Review Taxa. A classification of plants by the Idaho Native Plant Society that includes plants which may be of conservation concern, but for which there is insufficient data upon which to base a recommendation concerning their appropriate classification.

Idaho Sensitive Taxa. A classification of plants by the Idaho Native Plant Society that includes plants with small populations or localized distributions within Idaho that presently do not meet the criteria for classification as Idaho State Priority 1 or Priority 2 Taxa, but whose populations and habitats may be jeopardized if current land use practices continue.

Idaho State Priority 1 Taxa. A classification of plants by the Idaho Native Plant Society that includes plants that are in danger of becoming extinct from Idaho in the foreseeable future if identifiable factors contributing to its decline continue to operate; these are taxa whose populations are present only at critically low levels or whose habitrats have been degraded or depleted to a significant degree.

Idaho State Priority 2 Taxa. A classification of plants by the Idaho Native Plant Society that includes plants likely to be classified as Priority 1 within the foreseeable future in Idaho, if factors contributing to its population decline or habitat degradtion or loss continue.

Immature Timber. Trees that have not attained full development, especially height.

Indicator Species. See Management Indicator Species.

Indirect Effects. Secondary effects which occur in locations other than the initial action or significantly later in time.

Individual Tree Selection. A uneven-aged silvicultural harvest system that removes selected trees of all size classes on an individual basis.

Intensive Management. A high investment level of timber management that includes precommercial and commercial thinnings, plantings with genetically improved stock, control of competing vegetation, and other practices which increase tree growth.

Interdisciplinary (ID) Team. A group of resource professionals with different expertise that collaborate to develop and evaluate resource management decisions.

Intermediate Cutting. Any removal of trees from a stand between the time of its formation and the regeneration cut. Most commonly applied intermediate cuttings are release, thinning, sanitation, and salvage.

Intermittent Stream. A stream that runs water in most months, but does not run water during the dry season of most years.

Invertebrates. Animals having no backbone such as earthworms, insects, and lesser animals.

Issue. A subject or question of public discussion or interest to be addressed or desided in the planning process.

*** J ***

*** K ***

*** L ***

Limiting Factor. The environmental influence which exceeds the tolerance limit of an animal to restrict it in its activities, functions, or geographic range.

Litter. An organic surface soil layer usually composed of identifiable leaves, branches, other vegetative material, and animal remains.

*** M ***

Management Area. Geographic areas, not necessarily contiguous, which have common management direction, consistant with the Forest Plan allocations.

Management Indicator Species. A species selected because its welfare is presumed to be an indicator of the welfare of other species sharing similar habitat requirements. A Species of fish, wildlife, or plants which reflect ecological changes caused by land management activities.

Mature Timber. Trees that have attained full development, particularly height.

Minimum Management Requirement (MMR). Minimum standards for resource protection to met the goals and objectives of the National Forest System.

Mitigation. Actions to avoid, minimize, reduce, eliminate, replace, or rectify the impacts of a management practice.

Model. A formalized expression of a theory to describe, analyze, or understand a particular concept.

Monitoring and Evaluation. The evaluation, on a sample basis, of Forest Plan management practices to determine how well objectives are being met, as well as the effects of those management practices on the land and environment.

Mortality. In forestry, trees in a stand that die of natural causes.

Mountain Pine Beetle. The common name for the bark beetle (Dendroctonous Ponderosae Hopkins) which is the most destructive insect pest in the intermountain west.

Mulching. Covering the surface of the soil with natural (e.g. litter) or deliberately applied organic materials (e.g. straw, wood chips, foliage).

*** N ***

Natural Regeneration. Reforestation of a site by natural seeding from the surrounding tres. Natural regeneration may or may not be preceded by site preparation.

Noxious Weed. A plant species that is highly injurious or destructive and has a great potential for economic impact. A plant species that is listed as noxious by the State of Idaho.

*** O ***

Old-growth Habitat. Habitat for certain wildlife that is characterized by overmature coniferous forest stands with large snags and decaying logs.

Optimum Habitat. The amounts and arrangement of cover and forage that results in the greatest level of production that is consistent with other resource requirements.

Overstory. The portion of trees in a forest which forms the uppermost layer of foliage.

Overstory Removal. A harvest method that removes the overstory of a two-story stand and leaves the smaller understory for further treatment.

*** P ***

Particulates. Small particles suspended in the air and generally considered pollutants.

Pathogen. A specific causative agent of disease, such as a virus.

Peak Flow. The greatest flow attained during the melting of the winter snowpack.

Pioneer Species. A plant capable of invading bare site (newly exposed soil surface) and persisting there until replaced by another species or community as succession progresses.

Plant Community. An assembly of plants living together.

Pole Timber. Trees of at least five inches in diameter at breast height (DBH), but smaller than the minimum utilization standard for sawtimber.

Precommercial Thinning. The practice of removing some of the trees less than marketable size from a stand so that the remaining trees will grow faster.

Prescribed Burning. The application of fire to fuels in either a natural or modified state under such conditions as to allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives (i.e. silviculture, wildlife management, reduction of fuel hazard, etc.).

Prescription. Management practices selected and scheduled for application on a designated area to attain specific goals and objectives.

Puddling, Soil. A physical change in soil properties due to shearing forces that alters soil structure and porosity. Puddling occurs when the soil is at or near liquid limit.

*** Q ***

*** R ***

Recreation Opportunity Spectrum (ROS). A system for defining the types of outdoor recreation opportunities the public might desire and identifies that portion of the spectrum a given area might be able to provide. It is used for planning and managing the recreation resource and recognizes recreation activity, setting, and experience opportunities. The ROS classes within the Decision Area include: Semi-Primitive Motorized, Roaded Natural, Roaded Modified, and Rural.

> **Semi-Primitive Motorized (SPM)** - a recreation opportunity spectrum class, where an area of moderate-to-large size (generally at least 2,500 acres) is characterized by a predominately natural-appearing environment. This is an essentially unroaded area where motorized use is permitted.
>
> **Roaded Natural (RN)** - a recreation opportunity spectrum class that is characterized by an environment that remains natural appearing. It is along or near main forest roads and highways. You will find subtle modification to the natural environment. Improvements are limited to roads, trails, a few scattered structures, and moderately developed campgrounds. The natural environment still dominates, though timber harvest may be visable.
>
> **Roaded Modified (RM)** - a recreation opportunity spectrum class that is characterized by an environment that appears to be substantially modified. Normally it will be along less used forest roads. You will likely find large clearcuts and areas where management activities dominate the view. You will find increasing chances to get away from other recreation users, but logging activities will be present. A few low standard recreation facilities may be provided.
>
> **Rural (R)** - a recreation opportunity spectum class, that is characterized by a culturally modified yet attractive environment. This is a roaded area where roads are generally open to recreation use. There will be a high level of interaction between users.

Reforestatlon. The natural or artifical restocking of an area with forest trees.

Regeneration. The renewal of a tree crop, whether by natural or artificial means. This term may also refer to the crop itself (i.e. seedlings or saplings).

Regeneration Harvest. Used in reference to harvest methods which remove an existing stand to prepare the site for regeneration.

Release. Freeing trees from competition for light, water, and nutrients by removing or reducing the vegetation growth that is overtopping or closely surrounding them.

Research Natural Area. An area in as near a natural conditin as possible, which exemplifies typical or unique vegetation and associated biotic, soil, geological, and aquatic features. The area is set aside to preserve a representative smaple of an ecological community primarily for scientific and educational purposes; commercial and general public use is not allowed.

Residual Stand. The trees remaining standing after some activity such as a individual tree selection.

Riparian. Pertaining to areas of land directly influenced by water. Riparain areas usually have visible vegetative or physical characteristics reflecting this water influence. Stream sides, lake borders, or marshes are typical riparian areas. Vegetation bordering watercourses, lakes, or swamps; it requires a high water table.

*** S ***

Salvage. Intermediate harvests made to remove trees that are dead or in imminent danger of being killed by injurious agents such as insects.

Sanitation. Intermediate harvests made to remove dead, damaged, or susceptible trees to prevent the spread of pests or pathogens.

Sawtimber. Trees containing at least one 12-foot sawlog or two non-contiguous 8-foot logs, and meeting regional specifications for freedom from defect.

Scarification. The process to break up or loosen topsoil in preparation for regeneration.

Scoping. The procedures by which the Forest Service determines the extent of analysis necessary for a proposed action, i.e., the range of actions, alternatives, and impacts to be addressed, identification of significant issues related to a propsoed action, and establishing the depth of environmental analysis, data, and task assignments needed.

Scree. Any slope covered with loose rock fragments.

Sediment. Any material carried in suspension by water, which will ultimately settle to the bottom. Sediment has two main sources: from the channel area itself and from disturbed sites.

Seedtree Harvest. An even-aged regeneration harvest of the a portion of the mature timber from an area, except for a small number of seed-bearing trees left singly or in small groups for regeneration of a stand.

Sensitive Species. Those species identified by the Regional Forester for which population viability is a concers as evidenced by significant current or predicted downward trends in (a) population numbers or density, or (b) habitat capability that would reduce a species' existing distribution.

Seral. A biotic community which is a development, transitory stage in ecological succession.

Series. A group of habitat types having the same climax tree species.

Silviculture. The art and science of growing and tending forest vegetation, i.e., controlling the establishment, composition, and growth of forests, for specific management goals.

Shelterwood Harvest. An even-aged regeneration harvest of a portion of the mature stand while retaining a portion of the stand as a source of seed and protection during the regeneration period.

Silvicultural System. A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the cuttings that remove the mature crop and provide for regeneration, and according to the type of forest thereby produced. See Appendix A for descriptions of the silvicultural systems considered for the Decision Area.

Site Preparation. A general term for a variety of activities that remove or treat competing vegetation, slash, and other debris that may inhibit the establishment of regeneration.

Site Productivity. Production capability of specific areas of land.

Slash. The residue left on the ground after felling and other silvicultural operations and/or accumulating there as a result of storm, fire, girdling, or poisoning of trees.

Snag. A standing dead tree usually without merchantable value for timber products, but may have characteristics of benefit to some cavity nesting wildlife species.

Stand. A community of trees or other vegetation uniform in composition, constitution, spatial arrangement, or condition to be distinguishable from adjacent communities.

Succession. The progressive changes in plant communities toward climax.

Suitable Forest Land. Forest land (as defined in CFR 219.3, 219.14) for which technology is available that will insure timber production without irreversible resource damage to soils, productivity, or watershed conditions; for which there is a reasonable assurance that such lands can be adequately restocked (as provided in CFR 219.14); and for which there is management direction that indicates that timber production is an appropriate use of that area.

*** T ***

Talus. The loose accumulation of fragmented rock material on slopes, such as at the base of a cliff.

Thermal Cover. Vegetative cover used by animals to modify the adverse affects of weather.

Threatened Species. Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Travel Corridor. A belt or band of cover or habitat which allows animals to move from one location to another.

U

Understory. Vegetation (trees or shrubs) growing under the canopy formed by taller trees.

Uneven-aged Management. The application of a combination of actions needed to simultaneously maintain continuous high-forest cover. Harvest systems that develop or maintain uneven-aged stands are individual tree and group selection.

Ungulate. A mammal having hoofs, i.e. deer, elk, and moose.

Unsuitable Forest Land. Lands not selected for timber production during development of the Forest Plan due to: (1) multiple-use objectives that preclude timber production, (2) other managment objectives limit timber production activities to the point where managment requirements set forth in 36 CFR 219.27 cannot be met, and (3) the lands are not cost-efficient over the planning horizon in meeting forest objectives that include timber production. Land not appropriate for timber production was designated as unsuitable in the Forest Plan.

V

Vertebrates. Animals having a backbone, or a spinal column, including mammels, fishes, birds, reptiles, and amphibians.

Viable Population. A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area.

Visual Condition Class (VCC)

> **Untouched** - those areas of significant size (5,000 acres or larger) in which only ecological change has taken place, with the exception of trail construction.
>
> **Unnoticed** - areas where changes in the landscape are not visually evident to the average person unless pointed out.
>
> **Minor Disturbance** - changes in the landscape that are generally noticed by the average person, but they do not attract attention. The natural appearance of the landscape still remains dominant.
>
> **Disturbed** - areas where changes are easily noticed by the average person and may attract some attention.
>
> **Major Disturbance** - includes strong changes that would be obvious to anyone. These changes stand out as a dominant impression on the landscape, yet they are shaped so they might resemble natural patterns or have recovered to a point where they appear somewhat natural.
>
> **Drastic Disturbance** - areas in glaring contrast to the natural appearance; rehabilitation may be necessary.

Visual Quality Objective (VQO). A system of indicating the potential expectations of the visual resource by considering the frequency an area is viewed and the type of landscape. Specific VQO's are defined in Chapter III, page 22.

W

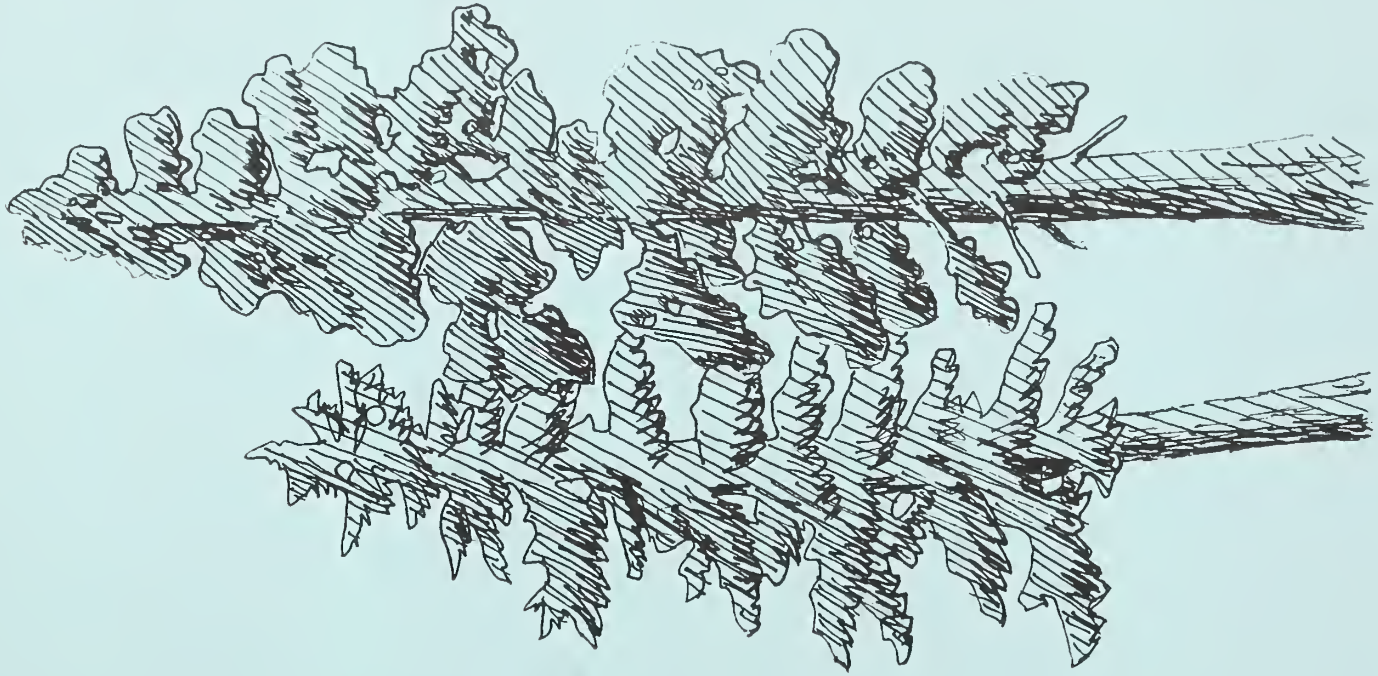
Water Yield. The measured output of the Forest's streams.

Wetlands. Areas that are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, wet meadows, river overflows, mud flats, and natural ponds.

Windrowing. Slash or debris piled in a row along the contour of the slope.

XYZ

APPENDIX A



APPROPRIATENESS OF EVEN-AGED MANAGEMENT

Both even-aged and uneven-aged silvicultural systems may be used to achieve area regulation, or a balanced timber age-class distribution. The features of each system were given consideration in the determination of how to best make progress toward a balanced age-class distribution. The discussion of the features of even-aged and uneven-aged silvicultural systems in the Forest Plan is adopted, and in conjunction with the following discussion, displays the effects of the two silvicultural systems and the rationale for selecting the appropriate harvest method (Forest Plan FEIS, Chapter IV).

The complete range of silvicultural systems available, both even-aged and uneven-aged systems, were considered for each stand in the Decision Area that was proposed for harvest. The following "Alternative Summary" tables identify, by harvest unit, the silvicultural harvest systems, site preparation (brush disposal), and regeneration methods that would be used for each alternative. The tables "WEST MOYIE SILVICULTURAL METHODS ASSESSMENT" that follow the alternative tables document the harvest systems appropriate for each stand. Following the tables is a discussion of the analysis process and a definition of the terminology used in the tables. A description of the silvicultural harvest systems considered follows.

Uneven-Aged System

Uneven-aged silviculture management perpetuates a forested environment by removing small groups or individual trees at periodic intervals. Recurring regeneration within the small openings created by these removals sustains the age and vertical diversity necessary to meet the goals of this system, namely a forested environment in which disturbance appears minimal and trees create cover and shade. Refer to the Forest Plan, Final EIS, for a full discussion on uneven-aged management systems (Forest Plan, FEIS, Chapter IV, Page IV-60). Both single tree and group selection silvicultural methods are discussed in detail.

Based upon the current condition and structure of the stands in the West Moyie Decision Area and the objective to increase the general health and vigor of forest stands, uneven-aged systems do not represent the optimal method of treating these stands and meeting these objectives. Uneven-aged management is normally not recommend in lodgepole pine stands (Alexander, 1986) as even-aged management best maintains a vigorous, productive forest in these stand types. In mixed conifer stands with a presence of root rot, single tree selection favors regeneration of the more shade-tolerant Douglas-fir and grand fir, both species which are susceptible to root rot, and discourages regeneration of the more intolerant pines and western larch. Both pure stands of lodgepole pine and root rot in mixed conifer stands are present within the West Moyie Decision Area (See Chapter 3, page 3-70 and Chapter 4, page 4-146). Even though uneven-aged management is not the optimal method of regenerating most stands in the West Moyie Decision Area, it was applied in several of the alternatives to meet the following resource needs: maintain cover on white-tailed deer winter range; maintain boreal owl nesting habitat; maintain goshawk nesting and feeding values, in the near term, while these values increase in adjacent unharvested stands to a level that would sustain overall suitable goshawk habitat; and maintain the high visual quality along the Moyie River.

Even-Aged System

Even-aged systems include clearcutting, shelterwood, and seed tree cutting, where the majority of the existing trees are removed from the stand in one entry. This method creates ecological conditions similar to those from the stand replacing wildfires and windstorms, the historical natural events that occurred around the turn of the century and created the even-aged stands so common in the Decision Area. Reforestation following logging would include both natural regeneration and artificial regeneration by planting of seral species. The discussion on even-aged management systems in the Forest Plan Final

EIS (Forest Plan, FEIS, Chapter IV, Page IV-53) describes common or conventional even-aged systems: clearcutting, seedtree and shelterwood.

Even-aged systems are the best suited silvicultural harvest systems to regenerate the stands of the West Moyie that are susceptible to mountain pine beetle infestations or root rot mortality. These systems closely parallel natural stand replacing events.

Intermediate Harvest Systems

Intermediate harvesting systems include: sanitation/salvaging, commercial thinning, and basal area thinning. These intermediate harvesting systems are used to achieve specific objectives as discussed below. They are not designed to result in regeneration, but sometimes do. They are used primarily prior to an even-aged regeneration system, but may be used as the first step in uneven-aged management. In most cases they would not preclude the later use of either an even-aged or uneven-aged regeneration harvest system. Basal area thinning in lodgepole pine stands would be the exception to this as uneven-aged management in lodgepole pine stands is not recommended.

SILVICULTURAL SYSTEMS

Several silvicultural systems are planned for use in the West Moyie Decision Area. These systems and their characteristics are discussed below.

Uneven-age Management: **(UNEVEN)**

Implementation of a single-tree selection system designed to result in an all-aged stand. Treatments would remove 15-20 percent of the volume in all size-classes every ten years, or 30-40 percent every twenty years. Unit size would vary, but units would not be subject to the 40 acre limitation.

***Group Selection*:** **(GRP SL)**

A form of uneven-age regeneration system where small group cuts are spread evenly through a stand. The diameter of the cuts would equal approximately twice the height of the timber in the area (or app. one acre). For the purpose of the West Moyie Area, the amount of the overall stand that would be actually cut would be approximately 10 percent. An area of 10 percent of the stand would be harvested each decade. Planting may be done to increase species deversity, primarily with rust-resistant white pine. The size of the stand where this system would be applied would vary and is not subject to the 40 acre limitation.

Commercial Thin: **(C THIN)**

Intermediate harvest that does not result in regeneration. Used primarily with even-age systems prior to regeneration harvest, but would not eliminate opportunity to convert stand at a later date to uneven-age systems. Treatment would remove approximately 33 percent of the stand, leaving larger trees evenly spaced with crowns free to grow before canopy closure occurs again. Unit size would vary, but units would not be subject to the 40 acre limitation.

Basal Area Thin: **(BA THN)**

Intermediate harvest designed to reduce predominately lodgepole pine stand susceptibility to infestation of mountain pine beetle by increasing bole temperatures. Treatment will remove up to

50 percent of stand, leaving 80 to 90 square feet of basal area per acre. Larger trees will be left evenly spaced. Treatment is not designed to result in regeneration, however some may occur. This treatment has been used successfully on the Flathead National Forest to reduce mortality in stands in the vicinity of mountain pine beetle epidemics. Unit size would vary, but units would not be subject to the 40 acre limitation.

***Sanitation-Salvage:* (SALV)**

Intermediate harvest designed to capture existing and expected mortality in the stand. For West Moyie this would be centered on harvesting white pine susceptible to blister rust, and lodgepole pine susceptible to mountain pine beetle. This treatment is not designed to result in regeneration. This treatment is used for both even-age management, and can be used as the first step in uneven-age systems. Treatment would remove from 10-50 percent% of the stand. Where lodgepole occurs in patches of one acre or larger, lodgepole leave trees would be designated to avoid creating openings. Unit size would vary, but units would not be subject to the 40 acre limitation.

***Clearcut:* (CC)**

Even-age system where nearly all trees are cut. Three to five snags or snag recruitment trees per acre would be left. Regeneration would be accomplished by planting after harvest. Units would vary in size by alternative but will be less than 40 acres.

***Seed Tree:* (ST)**

Even-age regeneration system where trees are left to provide seed to naturally regenerate stands. Interplanting may be done to increase species diversity, primarily with rust-resistant white pine. A minimum of 15 trees per acre would be left (approximately 54' x 54' spacing between leave trees). Leave trees will be some of the best trees in the stand for regeneration purposes. Seed trees will be removed in five to ten years when regeneration is well established and two to five feet tall. Three to five snags or snag recruitment trees per acre will be left. Units would vary in size by alternative but will be less than 40 acres.

***Seed Tree with Visuals*: (ST-V)**

Even-age regeneration system where trees are left to provide seed to naturally regenerate stands. Interplanting may be done to increase species diversity, primarily with rust-resistant white pine. A minimum of 15 trees per acre would be left (approximately 54' x 54' spacing between leave trees). Leave trees will be some of the best trees in the stand for regeneration purposes and would remain for an indefinite period of time. Most of those that are in excess of the snag and snag recruitment needs would be removed at the time of the first commercial thinning (approximately 60 years) or later depending on conditions and objectives at that time. Units would vary in size by alternative but will be less than 40 acres.

***Two-Stage Shelterwood:* (SW)**

Even-age regeneration system where trees are left to provide shelter and seed to naturally regenerate stands. Shelterwood can also be used to leave a denser canopy for visual quality. Initial treatment (seed cut) would remove most of the stand, leaving 30 to 40 trees per acre for shelter. Spacing would range from 33' x 33' (40 TPA) to 38' x 38' (30 TPA). Interplanting may be used as well. Residual trees (overwood) will be removed in five to ten years when regeneration is well established,

approximately two to five feet tall. During this overstory removal three to five snags or snag recruitment trees per acre will be left. Units would vary in size by alternative but will be less than 40 acres.

Two-Stage Shelterwood with Visuals: **(SW-V)**

Even-age regeneration system as above through first treatment, leaving 30 to 40 trees per acre for shelter or visuals. Second entry in ten to 20 years, would leave ten to 15 trees per acre that would remain for an indefinite period of time. Most of those that are in excess of the snag and snag recruitment needs would be removed at the time of the first commercial thinning (approximately 60 years) or later depending on conditions and objectives at that time. Units would vary in size by alternative but will be less than 40 acres.

Three-Stage Shelterwood with Visuals (Irregular Shelterwood): **(SW3-V)** (Considered but not used)

Even-age regeneration system similar to two-stage shelterwood with visuals above. Shelterwood will be used to leave a dense canopy for visual quality. Initial treatment (preparatory cut) would remove about 33 percent of the stand, leaving largest and best trees. Objective is to salvage existing and anticipated mortality while improving windfirmness of stand. Limited regeneration would occur at this treatment.

Second entry (seed cut) ten to twenty years later, would remove most of the stand, leaving 30 to 40 trees per acre for shelter. Spacing would range from 33' x 33' (40 TPA) to 38' x 38' (30 TPA). Interplanting may be used as well. Third entry may be delayed for sometime depending on visual recovery. That entry would leave 10 to 15 trees per acre that would remain for an indefinite period of time. Most of those that are in excess of the snag and snag recruitment needs would be removed at the time of the first commercial thinning (approximately 60 years) or later depending on conditions and objectives at that time. Units would vary in size by alternative but will be less than 40 acres.

Alternative Summary Legend

UNIT = Cutting Unit Number Corresponding to Map
SALE = Sale Unit Will Be Sold Under
- MF = Moyie Face - 1994
- HP = Hellroaring Peak Timber Sale - 1993
- QB = Queen Bussard - 1994
- HELI = Helicopter Timber Sale - 1996

ACRES = Size of Harvest Unit Expressed in Acres
STAND = Stand Number of Harvest Unit for Silvicultural Record Keeping System
MA = Forest Plan Management Area Number
- 1 = Allocated for Timber Production
- 4 = Allocated for Big Game Winter Range/Timber
- 9 = Maintain Developments - Generally Unsuitable for Timber Production

TYPE_CUT = Silvicultural Harvesting System
- OR = Overstory Removal Harvesting
- C THIN = Commercial Thinning
- ST = Seedtree Harvesting
- ST-V = Seedtree Harvesting with visual modification
- SW = Shelterwood Harvesting
- SW-V = Shelterwood Harvesting with visual modification
- CC = Clearcutting
- GRP SL = Group Selection
- SALV = Sanitation Salvage Harvesting
- ST/OR = Combination Seedtree/Overstory Removal
- BA THIN = Basal Area Thinning
- UNEVEN = Uneven Aged Management

LOG_SYSTM = Logging System to be Used for Unit
- S = Skyline Yarding
- T = Tractor Skidding
- H = Helicopter Logging

BD = Type of Slash Disposal/Site Prep Proposed
- BB = Broadcast Burning
- UB = Underburning
- Ple = Grapple Pile
- YT = Yard Tops

KV = Site Prep/Timber Stand Improvement/Reforestation Activities Planned
- Plt = Plant Seedlings and regeneration surveys
- Nat = Natural Regeneration, seed traps, and regen surveys
- Thn = Precommercial Thinning/Cull Tree Removal
- SPL = Spot Planting

VOL_MBF = Volume of Timber to be Removed Expressed in Thousand Board Feet

WEST MOYIE ALTERNATIVE B2 SUMMARY/DEC 13, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
27	HP	40	30-1-17,18	9	CC	S	BB	PLT	435
28		30	30-1-13,01	9	CC	S	BB	PLT	325
29		25	30-2-33,32	1	CC	T	BB	PLT	315
30		30	30-2-36,37	1	ST	S	UB	NAT	390
31		25	30-2-16,17	1	ST	S	UB	NAT	380
43		20	30-2-05	1	C THIN	T	YT		50
44		25	27-5-10	1	ST	T	PLE	PLT	450
57		40	27-2-43,47	1	CC	S	BB	PLT	1000
58		35	27-2-43,37	1	CC	S	BB	PLT	900
60		40	27-2-78,05	1	CC	S	BB	PLT	800
61		40	27-2-41,78	1	ST	S	UB	NAT	800
62		40	27-2-36	1	CC	T	BB	PLT	700
63		40	27-2-23,74	1	CC	T	BB	PLT	600
68		20	27-2-70	4	ST	T	PLE	NAT	130
71		20	27-5-26,32	1	ST	T	BB	PLT	180
119		100	30-2-01	1	BA THN	T	YT		440
120		100	27-5-10	1	SALV	T	YT		520
121		125	27-5-17,48	1	BA THN	T	YT		460
124		85	27-2-37,42	1	C THIN	T	YT		500
128		45	27-2-19,45	1	SALV	T	YT		150
129		100	27-2-30,34	1	SALV	S	YT		500
130		50	27-2-18,30	1	BA THN	T	YT		300
131		45	27-2-26	1	SALV	S	YT		200
132		50	27-2-19,29	1	SALV	T	YT		165

TOTAL ACRES FOR SALE 1170 TOTAL VOLUME/MBF FOR SALE 10690

1	MF	40	35-2-01	1	OR	T	YT	THN	350
9		25	35-1-09	1	ST	T	PLE	PLT	325
10		15	35-1-32,10	1	ST	T	YT	PLT	185
11		30	35-1-47,10	1	CC	T	YT	PLT	365
12		30	35-1-47,31	9	CC	T	YT	PLT	365
13		30	35-1-78,31	1	ST	T	UB	PLT	175
14		25	30-3-01	1	CC	H	BB	PLT	220
18		35	30-3-02,08	1	CC	T	YT	PLT	355
19		20	30-3-08,10	1	CC	T	YT	PLT	215
20		40	30-3-03,09	1	ST	T	YT	PLT	560
21		25	30-3-09,11	1	ST	T	PLE	PLT	355
22		50	30-2-39	1	SALV	T	YT		100
23		35	30-2-38	1	ST/OR	T	YT	SPL	365
24		30	30-2-38,39	1	SALV	T	YT		60
25		30	30-2-20,21	1	ST/OR	T	YT	SPL	245
26		30	30-2-23	1	ST/OR	T	YT	SPL	125
33		30	30-2-57,09	1	ST	T	PLE	NAT	415
34		20	30-2-19	1	CC	T	PLE	PLT	170
35		25	30-2-19	1	CC	T	PLE	PLT	210
36		25	30-2-19	1	CC	T	PLE	PLT	210
37		25	32-2-55	4	ST	T	PLE	NAT	300
38		25	30-2-47	1	ST	H	UB	PLT	290
39		25	30-2-47	1	ST	H	UB	PLT	290
40		35	27-5-03	1	C THIN	S	YT		110
41		35	27-5-01	1	ST	T	PLE	PLT	240
42		25	27-5-01	1	ST	T	PLE	PLT	165
45		5	30-2-59,58	1	ST	T	PLE	NAT	65
50		25	38-2-20,46	1	C THIN	S	YT		110
102		40	35-2-07	1	C THIN	T	YT		110

WEST MOYIE ALTERNATIVE B2 SUMMARY/DEC 13, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF

TOTAL ACRES FOR SALE 830 TOTAL VOLUME/MBF FOR SALE 7050

2	QB	25	35-2-09	1	C THIN	T	YT		175
3		30	35-2-65,35	1	C THIN	T	YT		125
4		30	35-2-02	1	C THIN	T	YT		90
7		40	35-1-43,25	1	ST	T	PLE	PLT	500
8		25	35-1-18	1	ST	S	UB	PLT	640
53		40	38-2-43,97	1	CC	T	PLE	PLT	475
54		40	38-5-64,65	1	CC	T	PLE	PLT	655
55		30	38-5-37,26	1	CC	S	BB	PLT	335
56		30	38-5-24,33	1	CC	S	BB	PLT	335

TOTAL ACRES FOR SALE 290 TOTAL VOLUME/MBF FOR SALE 3330

TOTAL ACRES 2290
TOTAL VOLUME/MBF 21070

WEST MOYIE ALTERNATIVE D SUMMARY/DEC 13, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
68	HP	40	27-2-70,51	4	UNEVEN	T	YT		50
117		70	30-2-05,04	1	C THIN	T	YT		280
118		90	30-2-14,36	1	BA THN	T	YT		300
119		100	30-2-01,02	1	BA THN	T	YT		440
120		100	27-5-10,49	1	SALV	T	YT		520
121		125	27-5-17,48	1	BA THN	T	YT		460
123		25	27-5-10	1	SALV	T	YT		150
124		85	27-2-37,42	1	C THIN	T	YT		500
126		55	27-2-36	1	BA THN	T	YT		350
128		45	27-2-19,14	1	SALV	T	YT		150
129		100	27-2-30,34	1	SALV	S	YT		500
130		50	27-2-18,30	1	BA THN	[illegible]	YT		300
131		45	27-2-26	1	SALV	S	YT		200
132		50	27-2-19,29	1	SALV	T	YT		165

TOTAL ACRES FOR SALE 980 TOTAL VOLUME/MBF FOR SALE 4365

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
1	MF	40	35-2-01	1	UNEVEN	T	YT	THN	60
33		30	30-2-57,19	1	SALV	T	YT		100
34		20	30-2-19	1	SW	T	PLE	NAT	90
35		25	30-2-19	1	SW	T	PLE	NAT	100
36		20	30-2-19	1	SW	T	PLE	NAT	90
37		40	32-2-55	4	SALV	T	YT		100
102		40	35-2-07	1	C THIN	T	YT		110
109		60	35-1-09,32	1	SALV	T	YT		225
110		100	35-1-10,47	1	BA THN	T	YT		410
111		190	30-3-3,8,9	1	UNEVEN	T	YT		850
112		100	30-2-39,28	1	SALV	T	YT		200
113		40	30-2-38	1	SW	T	UB		240

TOTAL ACRES FOR SALE 705 TOTAL VOLUME/MBF FOR SALE 2575

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
104	QB	90	35-1-43,25	1	SALV	T	YT		350
106		20	35-1-42	1	SALV	S	YT		120
127		150	38-2-30,43	1	SALV	T	YT		450

TOTAL ACRES FOR SALE 260 TOTAL VOLUME/MBF FOR SALE 920

TOTAL ACRES 1945
TOTAL VOLUME/MBF 7860

WEST MOYIE ALTERNATIVE E SUMMARY/DEC 13, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
44	HP	25	27-5-10	1	ST	T	PLE	PLT	450
62		40	27-2-36	1	ST	T	UB	NAT	620
68		40	27-2-70,51	4	UNEVEN	T	YT		50
119		100	30-2-01	1	BA THN	T	YT		440
120		100	27-5-10	1	SALV	T	YT		520
121		125	27-5-17,48	1	BA THN	T	YT		460
124		85	27-2-37,42	1	C THIN	T	YT		500
128		45	27-2-19,14	1	SALV	T	YT		150
129		100	27-2-30,34	1	SALV	S	YT		500
130		50	27-2-18,30	1	BA THN	T	YT		300
131		45	27-2-26	1	SALV	S	YT		200
132		50	27-2-19,29	1	SALV	T	YT		165
TOTAL ACRES FOR SALE		805			TOTAL VOLUME/MBF FOR SALE		4355		
1	MF	40	35-2-01	1	UNEVEN	T	YT	THN	60
33		30	30-2-57,19	1	SW	T	PLE	NAT	360
37		25	32-2-55	4	SW	T	PLE	NAT	250
45		5	30-2-59,58	1	SW	T	PLE	NAT	45
50		25	38-2-20,46	1	C THIN	S	YT		110
TOTAL ACRES FOR SALE		125			TOTAL VOLUME/MBF FOR SALE		825		
7	QB	40	35-1-43,25	1	ST	T	PLE	PLT	500
106		20	35-1-42	1	SALV	S	YT		120
TOTAL ACRES FOR SALE		60			TOTAL VOLUME/MBF FOR SALE		620		

TOTAL ACRES 990
TOTAL VOLUME/MBF 5800

WEST MOYIE ALTERNATIVE E SUMMARY/DEC 13, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
44	HP	25	27-5-10	1	ST	T	PLE	PLT	450
62		40	27-2-36	1	ST	T	UB	NAT	620
68		40	27-2-70,51	4	UNEVEN	T	YT		50
119		100	30-2-01	1	BA THN	T	YT		440
120		100	27-5-10	1	SALV	T	YT		520
121		125	27-5-17,48	1	BA THN	T	YT		460
124		85	27-2-37,42	1	C THIN	T	YT		500
128		45	27-2-19,14	1	SALV	T	YT		150
129		100	27-2-30,34	1	SALV	S	YT		500
130		50	27-2-18,30	1	BA THN	T	YT		300
131		45	27-2-26	1	SALV	S	YT		200
132		50	27-2-19,29	1	SALV	T	YT		165

TOTAL ACRES FOR SALE 805 TOTAL VOLUME/MBF FOR SALE 4355

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
1	MF	40	35-2-01	1	UNEVEN	T	YT	THN	60
33		30	30-2-57,19	1	SW	T	PLE	NAT	360
37		25	32-2-55	4	SW	T	PLE	NAT	250
45		5	30-2-59,58	1	SW	T	PLE	NAT	45
50		25	38-2-20,46	1	C THIN	S	YT		110

TOTAL ACRES FOR SALE 125 TOTAL VOLUME/MBF FOR SALE 825

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
7	QB	40	35-1-43,25	1	ST	T	PLE	PLT	500
106		20	35-1-42	1	SALV	S	YT		120

TOTAL ACRES FOR SALE 60 TOTAL VOLUME/MBF FOR SALE 620

TOTAL ACRES 990
TOTAL VOLUME/MBF 5800

WEST MOYIE ALTERNATIVE EH SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
10	HELI	13	35-1-32,10	1	SW-V	H	LOP	NAT	130
11		40	35-1-47,10	1	SW-V	H	LOP	NAT	400
12		15	35-1-31	1	SW-V	H	LOP	NAT	150
18		15	30-3-02,08	1	SW-V	H	PLE	NAT	70
19		15	30-3-08,10	1	SW-V	H	PLE	NAT	95
20		25	30-3-03	1	SW-V	H	PLE	NAT	290
21		20	30-3-11	1	ST/OR	H	PLE	NAT	240
22		30	30-2-39	1	SW-V	H	PLE	NAT	285
24		20	30-2-38,39	1	SW-V	H	PLE	NAT	180
111		85	30-3-02,10	1	SALV	H	LOP		245
113		30	30-2-09	1	SALV	H	LOP		165
134		245	30-1-[illegible],38	9	SALV	H	LOP		910
135		101	35-1-56,57	1	SALV	H	LOP		325
136		70	35-1-18,22	1	SALV	H	LOP		130
137		82	35-1-01,29	1	SALV	H	LOP		655
138		40	30-2-17	1	SW	H	LOP	NAT	480
139		30	35-1-35	1	SW	H	LOP	NAT	305
140		49	35-1-52	1	OR	H	LOP		310
141		45	30-2-18	1	BA THN	H	LOP		365
142		69	30-2-45	1	C THIN	H	LOP		275
143		99	35-1[illegible]	9	C THIN	H	LOP		795
144		77	35-1[illegible]6,53	1	BA THN	H	LOP		900
145		65	30-1-34	9	SALV	H	LOP		300
146		60	30-2-13	1	SALV	H	LOP		220
147		174	30-2-46,47	1	SALV	H	LOP		475

TOTAL ACRES FOR SALE 1514 TOTAL VOLUME/MBF FOR SALE 8695

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
44	HP	25	27-5-10	1	ST	T	PLE	PLT	450
62		40	27-2-36	1	ST	T	UB	NAT	620
68		40	27-2-70,51	4	UNEVEN	T	YT		50
71		20	27-5-26,32	1	ST	T	PLE	PLT	180
72		35	27-5-22	1	ST	T	PLE	NAT	440
119		100	30-2-01	1	BA THN	T	YT		440
120		100	27-5-10	1	SALV	T	YT		520
121		125	27-5-17,48	1	BA THN	T	YT		460
124		85	27-2-37,42	1	C THIN	T	YT		500
128		45	27-2-19,14	1	SALV	T	YT		150
129		100	27-2-30,34	1	BA THN	S	YT		500
130		50	27-2-18,30	1	BA THN	T	YT		300
131		45	27-2-26,27	1	SALV	T	YT		200
132		50	27-2-19,29	1	SALV	T	YT		165

TOTAL ACRES FOR SALE 860 TOTAL VOLUME/MBF FOR SALE 4975

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
1	MF	40	35-2-01	1	OR	T	YT	THN	350
1A		40	35-2-01	1	OR	T	YT	THN	350
13		30	35-1-78,31	1	SW-V	T	YT	NAT	125
14		20	30-3-01	1	SW-V	T	YT	NAT	90
33		20	30-2-57,19	1	UNEVEN	T	YT		75
34		15	30-2-19	1	SW-V	T	YT	NAT	70
35		20	30-2-19	1	SW-V	T	YT	NAT	85
37		20	32-2-55	4	UNEVEN	T	YT		50
45		5	30-2-59,58	1	SW-V	T	YT	NAT	45
50		25	38-2-20,46	1	C THIN	S	YT		110

WEST MOYIE ALTERNATIVE EH SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
TOTAL ACRES FOR SALE		235	TOTAL VOLUME/MBF FOR SALE			1350			
7	QB	40	35-1-43,25	1	ST-V	T	PLE	PLT	500
106		20	35-1-42	1	SALV	S	YT		120
TOTAL ACRES FOR SALE		60	TOTAL VOLUME/MBF FOR SALE			620			

TOTAL ACRES 2669
TOTAL VOLUME/MBF 15640

WEST MOYIE ALTERNATIVE H SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
30	HP	20	30-2-36,37	1	ST	S	UB	NAT	260
31		25	30-2-16,17	1	ST	S	UB	NAT	380
44		25	27-5-10	1	ST	T	PLE	PLT	450
62		40	27-2-36	1	ST	T	UB	NAT	620
63		40	27-2-23,74	1	ST	T	UB	NAT	520
68		40	27-2-70	4	UNEVEN	T	YT		50
71		20	27-5-26,32	1	ST	T	PLE	PLT	180
119		100	30-2-01	1	BA THN	T	YT		440
120		100	27-5-10	1	SALV	T	YT		520
121		125	27-5-17,48	1	BA THN	T	YT		460
124		85	27-2-37,42	1	C THIN	T	YT		500
128		45	27-2-19,14	1	SALV	T	YT		150
129		100	27-2-30,34	1	SALV	S	YT		500
130		50	27-2-18,30	1	BA THN	T	YT		300
131		45	27-2-26	1	SALV	S	YT		200
132		50	27-2-19,29	1	SALV	T	YT		165

TOTAL ACRES FOR SALE 910 TOTAL VOLUME/MBF FOR SALE 5695

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
1	MF	[illegible]	35-2-01	1	OR	T	YT	THN	[illegible]
9		25	35-1-09	1	SW	T	PLE	NAT	275
10		13	35-1-32,10	1	ST	T	PLE	NA	160
11		40	35-1-47,10	1	SW	T	PLE	NAT	400
12		15	35-1-31	9	SW	T	PLE	NAT	150
13		20	35-1-78,31	1	ST	T	PLE	PLT	110
19		13	30-3-08,10	1	SW	T	PLE	NAT	80
20		40	30-3-03,09	1	SW	T	PLE	NAT	480
21		14	30-3-09,11	1	ST	SWNG	PLE	NAT	205
23		15	30-2-38	1	ST/OR	T	YT	SPL	155
25		17	30-2-20,21	1	ST/OR	T	YT	SPL	135
33		30	30-2-57,19	1	UNEVEN	T	YT		110
34		8	30-2-19	1	ST	T	PLE	NAT	110
35		10	30-2-19	1	ST	T	PLE	NAT	135
36		10	30-2-19	1	ST	T	PLE	NAT	135
37		40	32-2-55	4	UNEVEN	T	YT		120
40		35	27-5-03	1	C THIN	S	YT		110
41		20	27-5-01	1	ST	T	PLE	NAT	135
42		20	27-5-01	1	ST	T	PLE	NAT	135
50		25	38-2-20,46	1	C THIN	S	YT		110
102		40	35-2-07	1	C THIN	T	YT		110
111		30	30-3-3,8,9	1	UNEVEN	T	YT		130
112		100	30-2-38,39	1	SALV	T	YT		200

TOTAL ACRES FOR SALE 620 TOTAL VOLUME/MBF FOR SALE 4040

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
7	QB	40	35-1-43,25	1	ST	T	PLE	PLT	500
53		40	38-2-43,97	1	CC	T	PLE	PLT	475
54		40	38-5-64,65	1	CC	T	PLE	PLT	635
55		15	38-5-37	1	CC	T	BB	PLT	165
56		15	38-5-24,37	1	CC	T	BB	PLT	165
56A		15	38-5-24	1	CC	T	BB	PLT	165

TOTAL ACRES FOR SALE 165 TOTAL VOLUME/MBF FOR SALE 2105

TOTAL ACRES 1695
TOTAL VOLUME/MBF 11840

WEST MOYIE ALTERNATIVE I SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
30	HP	20	30-2-36,37	1	ST	S	UB	NAT	260
44		20	27-5-10	1	ST	T	PLE	PLT	365
63		40	27-2-23,74	1	CC	T	BB	PLT	600
68		40	27-2-70	4	UNEVEN	T	YT		50
71		15	27-5-26,32	1	ST	T	PLE	PLT	135
119		80	30-2-01,02	1	BA THN	T	YT		350
121		80	27-5-17,48	1	BA THN	T	YT		295
124		85	27-2-37,42	1	C THIN	T	YT		500
128		45	27-2-19,14	1	SALV	T	YT		150
129		100	27-2-30,34	1	SALV	S	YT		500
130		50	27-2-18,30	1	BA THN	T	YT		300
131		45	27-2-26	1	SALV	S	YT		2[illegible]

TOTAL ACRES FOR SALE 620 TOTAL VOLUME/MBF FOR SALE 3705

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
1	MF	40	35-2-01	4	UNEVEN	T	YT	THN	60
10		5	35-1-32	4	ST	T	PLE	NAT	65
10A		5	35-1-32,10	4	ST	T	PLE	NAT	65
11		30	35-1-47,46	1	ST	T	PLE	PLT	340
12		5	35-1-31	4	ST	T	PLE	NAT	5[illegible]
12A		5	35-1-47	4	ST	T	PLE	NAT	
12B		5	35-1-47	4	ST	T	PLE	NAT	5
20		30	30-3-03,09	1	ST	T	PLE	PLT	400
21		5	30-3-11	4	ST	SWNG	PLE	NAT	70
22		5	30-1-40	4	ST	T	PLE	NAT	50
23		5	30-2-39,38	4	ST	T	PLE	NAT	50
24		5	30-2-39,38	4	ST	T	PLE	NAT	50
25		5	30-2-38,70	4	ST	T	PLE	NAT	50
26		5	30-2-19	4	ST	T	PLE	NAT	35
27		5	30-2-19	4	ST	T	PLE	NAT	35
28		5	30-2-19	4	ST	T	PLE	NAT	35
29		5	30-2-19	4	ST	T	PLE	NAT	35
31		5	30-2-19	4	ST	T	PLE	NAT	35
33		30	30-2-57,19	4	UNEVEN	T	YT		110
37		25	32-2-55	4	UNEVEN	T	YT		90
38		25	30-2-47	1	ST	H	UB	NAT	265
39		25	30-2-47	1	ST	H	UB	NAT	265
102		40	35-2-07	1	C THIN	T	YT		110
112		80	30-2-38,39	1	SALV	T	YT		160

TOTAL ACRES FOR SALE 400 TOTAL VOLUME/MBF FOR SALE 2540

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
7	QB	40	35-1-43,25	1	ST	T	PLE	PLT	500
55		15	38-5-37	1	CC	T	BB	PLT	165
56		15	38-5-24,37	1	CC	T	BB	PLT	165
56A		15	38-5-24	1	CC	T	BB	PLT	165

TOTAL ACRES FOR SALE 85 TOTAL VOLUME/MBF FOR SALE 995

TOTAL ACRES 1105
TOTAL VOLUME/MBF 7240

WEST MOYIE ALTERNATIVE J1 SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
29	HP	50	30-2-06,07	1	BA THN	T	YT		200
30		15	30-2-14,36	1	ST	T	UB	NAT	150
31		15	30-2-16,14	1	ST	S	UB	NAT	230
44		20	27-5-10	1	ST	T	PLE	PLT	365
57		27	27-2-43	1	ST	S	UB	PLT	635
62		35	27-2-36,35	1	ST	T	UB	NAT	565
63		40	27-2-23,74	1	ST	T	UB	NAT	520
71		20	27-5-26,32	1	ST	T	PLE	PLT	180
72		35	25-5-22	1	ST	T	PLE	NAT	440
119		140	30-2-01,11	1	BA THN	T	YT		615
119A		30	30-2-02,03	1	BA THN	S	YT		230
1[illegible]1		130	27-5-17,48	1	BA THN	T	YT		460
1[illegible]4		100	27-2-37,42	1	C THIN	T	YT		590
128		45	27-2-19,14	1	SALV	T	YT		150
129		45	27-2-96,97	1	BA THN	T	YT		200
130		70	27-2-18,30	1	BA THN	T	YT		420
130A		22	27-2-30,18	1	BA THN	T	YT		130
131		80	27-2-26,31	1	SALV	T	YT		355
132		50	27-2-19,29	1	SALV	T	YT		165
[illegible]A		10	27-2-16,18	1	BA THN	T	YT		60
133		70	27-2-30,39	1	BA THN	T	YT		500

TOTAL ACRES FOR SALE 1049 TOTAL VOLUME/MBF FOR SALE 7160

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
1	MF	40	35-2-01	1	OR	T	YT	THN	350
1A		40	35-2-01	1	OR	T	YT	THN	350
10		13	35-1-32,10	1	ST	T	PLE	NAT	160
11		40	35-1-47,10	1	SW	T	PLE	NAT	400
12		15	35-1-31	1	SW	T	UB	NAT	150
13		15	35-1-78,31	1	ST	T	UB	NAT	90
14		15	30-3-01,41	1	SW	T	UB	NAT	70
19		10	30-3-08	1	ST	T	UB	NAT	80
20		15	30-3-03	1	SW	T	PLE	NAT	175
21		10	30-3-11	1	ST/OR	T	YT	NAT	120
22		30	30-2-39	1	SW	T	PLE	NAT	285
24		15	30-2-38,39	1	SW	T	PLE	NAT	130
33		20	30-2-57,19	1	UNEVEN	T	YT		75
34		15	30-2-19	1	SW	T	PLE	NAT	65
35		15	30-2-19	1	SW	T	PLE	NAT	65
37		20	32-2-55	4	UNEVEN	T	YT		50
111		25	30-3-02080	1	SALV	T	YT		70
112		30	30-3-08	1	SALV	S	YT		115
113		15	30-3-09	1	SALV	S	YT		105
114		20	30-2-09	1	SALV	T	YT		120

TOTAL ACRES FOR SALE 418 TOTAL VOLUME/MBF FOR SALE 3025

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
3	QB	25	35-2-65,35	1	C THIN	T	YT		100
7		40	35-1-43,25	1	ST	T	PLE	PLT	500
8		15	35-1-18	1	ST	S	UB	NAT	390

TOTAL ACRES FOR SALE 80 TOTAL VOLUME/MBF FOR SALE 990

TOTAL ACRES 1547
TOTAL VOLUME/MBF 11175

WEST MOYIE ALTERNATIVE J2 SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
29	HP	50	30-2-06,07	1	BA THN	T	YT		200
30		15	30-2-14,36	1	ST	T	UB	NAT	150
31		15	30-2-16,14	1	ST	S	UB	NAT	230
44		20	27-5-10	1	ST	T	PLE	PLT	365
57		27	27-2-43	1	ST	S	UB	PLT	635
62		35	27-2-36,35	1	ST	T	UB	NAT	565
63		40	27-2-23	1	ST	T	UB	NAT	520
71		20	27-5-26,32	1	ST	T	PLE	PLT	180
72		35	27-5-22	1	ST	T	PLE	NAT	440
119		140	30-2-01,11	1	BA THN	T	YT		615
119A		30	30-2-02,03	1	BA THN	S	YT		230
121		130	27-5-17,48	1	BA THN	T	YT		460
124		100	27-2-37,42	1	C THIN	T	YT		590
128		45	27-2-19,14	1	SALV	T	YT		150
129		45	27-2-96,97	1	BA THN	T	YT		200
130		70	27-2-18,30	1	BA THN	T	YT		420
130A		22	27-2-30,18	1	BA THN	T	YT		130
131		80	27-2-26,31	1	SALV	T	YT		355
132		50	27-2-19,29	1	SALV	T	YT		165
132A		10	27-2-16,18	1	BA THN	T	YT		60
133		70	27-2-30,39	1	BA THN	T	YT		500

TOTAL ACRES FOR SALE 1049 TOTAL VOLUME/MBF FOR SALE 7160

1	MF	40	35-2-01	1	OR	T	YT	THN	350
1A		40	35-2-01	1	OR	T	YT	THN	350
10		13	35-1-32,10	1	ST	T	PLE	NAT	160
11		40	35-1-47,10	1	SW	T	PLE	NAT	400
11A		30	35-1-47,11	1	BA THN	T	YT		100
12		15	35-1-31	1	SW	T	PLE	NAT	150
13		20	35-1-78,31	1	ST	T	UB	NAT	110
14		20	30-3-01	1	SW	T	UB	NAT	90
18		15	30-3-02,08	1	ST	T	UB	NAT	100
19		15	30-3-08,10	1	ST	T	UB	NAT	125
20		25	30-3-03	1	SW	T	PLE	NAT	290
21		20	30-3-11	1	ST/OR	T	YT	NAT	240
22		30	30-2-39	1	SW	T	PLE	NAT	285
23		15	30-2-38	1	ST/OR	T	YT	SPL	150
24		20	30-2-38,39	1	SW	T	PLE	NAT	180
33		20	30-2-57,19	1	UNEVEN	T	YT		75
34		15	30-2-19	1	SW	T	PLE	NAT	70
35		20	30-2-19	1	SW	T	PLE	NAT	85
36		15	30-2-19	1	SW	T	PLE	NAT	70
37		20	32-2-55	4	UNEVEN	T	YT		50
111		55	30-3-02,10	1	SALV	T	YT		150
112		30	30-3-08	1	SALV	S	YT		115
113		15	30-3-09	1	SALV	S	YT		105
114		15	30-3-09	1	SALV	T	YT		100

TOTAL ACRES FOR SALE 563 TOTAL VOLUME/MBF FOR SALE 3900

3	QB	25	35-2-65,35	1	C THIN	T	YT		100
7		40	35-1-43,25	1	ST	T	PLE	PLT	500
8		15	35-1-18	1	ST	S	UB		390
53		30	38-2-43,97	1	CC	T	PLE	PLT	310
55		15	38-5-37	1	CC	T	BB	PLT	165

WEST MOYIE ALTERNATIVE J2 SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
56	QB	15	38-5-24,37	1	CC	T	BB	PLT	165
56A		15	38-5-24,06	1	CC	T	BB	PLT	165

TOTAL ACRES FOR SALE 155 TOTAL VOLUME/MBF FOR SALE 1795

TOTAL ACRES 1767
TOTAL VOLUME/MBF 12855

WEST MOYIE ALTERNATIVE J2H SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
134	HELI	245	30-1-05,38	9	SALV	H	LOP		910
135		101	35-1-56,57	1	SALV	H	LOP		325
136		70	35-1-18,22	1	SALV	H	LOP		130
137		82	35-1-01,29	1	SALV	H	LOP		655
138		40	30-2-17	1	SW	H	LOP	NAT	480
139		30	35-1-35	1	SW	H	LOP	NAT	305
140		49	35-1-52	1	OR	H	LOP		310
141		45	30-2-18	1	BA THN	H	LOP		365
142		69	30-2-45	1	C THIN	H	LOP		275
143		99	35-1-21	9	C THIN	H	LOP		795
144		77	35-1-46,53	1	BA THN	H	LOP		900
145		65	30-[illegible]34	9	SALV	H	LOP		300
146		60	30-2-13	1	SALV	H	LOP		220
147		174	30-2-46,47	1	SALV	H	LOP		475

TOTAL ACRES FOR SALE 1206 TOTAL VOLUME/MBF FOR SALE 6445

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
29	HP	50	30-2-06,07	1	BA THN	T	YT		200
30		15	30-2-14,36	1	ST	T	UB	NAT	150
31		15	30-2-[illegible]	1	ST	S	UB	NAT	230
44		20	27-[illegible]10	1	ST	T	PLE	PLT	365
57		27	27[illegible]-43	1	ST	S	UB	PLT	635
62		35	27-2-36,35	1	ST	T	UB	NAT	565
63		40	27-2-23	1	ST	T	UB	NAT	520
71		20	27-5-26,32	1	ST	T	PLE	PLT	180
72		35	27-5-22	1	ST	T	PLE	NAT	440
119		140	30-2-01,11	1	BA THN	T	YT		615
119A		30	30-2-02,03	1	BA THN	S	YT		230
121		130	27-5-17,48	1	BA THN	T	YT		460
124		100	27-2-37,42	1	C THIN	T	YT		590
128		45	27-2-19,14	1	SALV	T	YT		150
129		45	27-2-96,97	1	BA THN	T	YT		200
130		70	27-2-18,30	1	BA THN	T	YT		420
130A		22	27-2-30,18	1	BA THN	T	YT		130
131		80	27-2-26,31	1	SALV	T	YT		355
132		50	27-2-19,29	1	SALV	T	YT		165
132A		10	27-2-16,18	1	BA THN	T	YT		60
133		70	27-2-30,39	1	BA THN	T	YT		500

TOTAL ACRES FOR SALE 1049 TOTAL VOLUME/MBF FOR SALE 7160

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
1	MF	40	35-2-01	1	OR	T	YT	THN	350
1A		40	35-2-01	1	OR	T	YT	THN	350
10		13	35-1-32,10	1	ST	T	PLE	NAT	160
11		40	35-1-47,10	1	SW	T	PLE	NAT	400
11A		30	35-1-47,11	1	BA THN	T	YT		100
12		15	35-1-31	1	SW	T	PLE	NAT	150
13		20	35-1-78,31	1	ST	T	UB	NAT	110
14		20	30-3-01	1	SW	T	UB	NAT	90
18		15	30-3-02,08	1	ST	T	UB	NAT	100
19		15	30-3-08,10	1	ST	T	UB	NAT	125
20		25	30-3-03	1	SW	T	PLE	NAT	290
21		20	30-3-11	1	ST/OR	T	YT	NAT	240
22		30	30-2-39	1	SW	T	PLE	NAT	285
23		15	30-2-38	1	ST/OR	T	YT	SPL	150
24		20	30-2-38,39	1	SW	T	PLE	NAT	180

WEST MOYIE ALTERNATIVE J2H SUMMARY/DEC 14, 1990

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
33	MF	20	30-2-57,19	1	UNEVEN	T	YT		75
34		15	30-2-19	1	SW	T	PLE	NAT	70
35		20	30-2-19	1	SW	T	PLE	NAT	85
36		15	30-2-19	1	SW	T	PLE	NAT	70
37		20	32-2-55	4	UNEVEN	T	YT		50
111		55	30-3-02,10	1	SALV	T	YT		150
112		30	30-3-08	1	SALV	S	YT		115
113		15	30-3-09	1	SALV	S	YT		105
114		15	30-3-09	1	SALV	T	YT		100

TOTAL ACRES FOR SALE 563 TOTAL VOLUME/MBF FOR SALE 3900

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
3	QB	25	35-2-65 35	1	C THIN	T	YT		100
7		40	35-1-43,25	1	ST	T	PLE	PLT	500
8		15	35-1-18	1	ST	S	UB		390
53		30	38-2-43,97	1	CC	T	PLE	PLT	310
55		15	38-5-37	1	CC	T	BB	PLT	165
56		15	38-5-24,37	1	CC	T	BB	PLT	165
56A		15	38-5-24,06	1	CC	T	BB	PLT	165

TOTAL ACRES FOR SA 155 TOTAL VOLUME/MBF FOR SALE 1795

TOTAL ACRES 2973
TOTAL VOLUME/MBF 19300

WEST MOYIE ALTERNATIVE K SUMMARY/FEB 12, 1991

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
135	HELI	101	35-1-56,57	1	C THIN	H	LOP		435
136		70	35-1-18,22	1	SALV	H	LOP		130
137		82	35-1-01,29	1	SALV	H	LOP		655
138		40	30-2-17	1	SW-V	H	LOP	NAT	480
139		30	35-1-35	1	SW-V	H	LOP	NAT	305
140		49	35-1-52	1	OR	H	LOP		310
141		45	30-2-18	1	BA THN	H	LOP		365
142		69	30-2-45	1	C THIN	H	LOP		275
143		99	35-1-21	9	C THIN	H	LOP		795
144		77	35-1-46,53	1	BA THN	H	LOP		900
146		60	30-2-13	1	SALV	H	LOP		220
147		60	30-2-46	1	SALV	H	LOP		170

TOTAL ACRES FOR SALE 782 TOTAL VOLUME/MBF FOR SALE 5040

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
31	HP	47	30-2-14,16	1	SALV	T	YT		200
57		27	27-2-43	1	C THIN	S	YT		270
62		55	27-2-36,35	1	C THIN	T	YT		350
63		40	27-2-23	1	ST-V	T	PLE	NAT	520
71		20	27-5-26,32	1	ST	T	PLE	PLT	210
72		35	27-5-22	1	ST	T	PLE	PLT	450
119		160	30-2-01,11	1	BA THN	T	YT		775
119A		30	30-2-02,03	1	BA THN	S	YT		230
121		130	27-5-17,48	1	BA THN	T	YT		460
124		100	27-2-37,42	1	C THIN	T	YT		800
128		45	27-2-19,14	1	SALV	T	YT		170
129		45	27-2-96,97	1	BA THN	T	YT		200
130		70	27-2-18,30	1	BA THN	T	YT		490
130A		22	27-2-30,18	1	BA THN	T	YT		250
131		80	27-2-26,31	1	SALV	T	YT		355
132		30	27-2-19,29	1	SALV	T	YT		100
132A		10	27-2-16,18	1	BA THN	T	YT		60
132B		23	27-2-19,29	1	BA THN	T	YT		205
133		35	27-2-38	1	BA THN	T	YT		400
133A		20	27-2-30	1	BA THN	T	YT		225

TOTAL ACRES FOR SALE 1024 TOTAL VOLUME/MBF FOR SALE 6720

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
1	MF	271	35-2-01	1	GRP SL	T	YT	THN	270
9		67	35-1-09	1	SALV	T	YT		250
10		13	35-1-32,10	1	SW-V	T	PLE	NAT	130
11		40	35-1-47,10	1	SW-V	T	PLE	NAT	380
11A		30	35-1-47,11	1	BA THN	T	YT		110
12		15	35-1-31	1	SW-V	T	PLE	NAT	140
13		20	35-1-78,31	1	SW-V	T	PLE	NAT	50
14		20	30-3-01	1	SW-V	T	YT	NAT	105
18		15	30-3-02,08	1	SW-V	T	PLE	NAT	80
19		15	30-3-08,10	1	SW-V	T	PLE	NAT	95
20		15	30-3-03	1	SW-V	T	PLE	NAT	175
20A		10	30-3-03	1	SALV	T	YT		65
21		20	30-3-11	1	BA THN	T	YT		80
22		75	30-2-39	1	GRP SL	T	YT	NAT	120
23		51	30-2-38	1	GRP SL	T	YT	NAT	125
25		50	30-2-20,21	1	GRP SL	T	YT	NAT	45
26		63	30-2-23	1	GRP SL	T	YT	NAT	35
33		20	30-2-57,19	1	UNEVEN	T	YT		75

WEST MOYIE ALTERNATIVE K SUMMARY/FEB 12, 1991

UNIT	SALE	ACRES	STAND	MA	TYPE_CUT	LOG_SYSTM	BD	KV	VOL_MBF
34	MF	15	30-2-19	1	SW-V	T	PLE	NAT	60
35		20	30-2-19	1	SW-V	T	PLE	NAT	75
36		15	30-2-19	1	SW-V	T	PLE	NAT	60
37		20	32-2-55	4	UNEVEN	T	YT		50
102		40	35-2-07	1	C THIN	T	YT		110
111		55	30-3-02,10	1	GRP SL	T	YT	NAT	180
112		30	30-3-08	1	SALV	S	YT		100
113		15	30-3-09	1	SALV	S	YT		125
114		15	30-3-09	1	SALV	T	YT		105

TOTAL ACRES FOR SALE 1035 TOTAL VOLUME/MBF FOR SALE 3195

7	QB	30	35-1-43,25	1	ST-V	T	PLE	PLT	370
8		15	35-1-18	1	ST	T	PLE	NAT	370
53		92	38-2-30,43	1	GRP SL	T	PLE	PLT	90
56		120	38-5-24,37	1	GRP SL	T	PLE	PLT	135

TOTAL ACRES FOR SALE 257 TOTAL VOLUME/MBF FOR SALE 965

TOTAL ACRES 3098
TOTAL VOLUME/MBF 15920

WEST MOYIE SILVICULTURAL METHODS ASSESSMENT

Stand	Unit	Currently Target?	Defer?	Modified	Shelter Wood	Seed Tree	Clear Cut	Uneven-Aged
					<---------- REGENERATION OPTIONS			---------->
27-2-23	63	no	no	Maybe - Basal Area Thin	Lacks tree numbers	Fair leave trees	Good option	no
27-2-36	62	no	no	Some good commercial thin	Good to poor distribution Fire Resistance	Fair to good trees	Good option plant WP	Lots of cull
27-2-37	59	no	yes	Excellent growth - commercial thin	Good choice trees	Good choice	Could work in WP pockets	Poor species mix and strong even characteristics.
27-2-41	61	no	yes	no	Lack good coverage fire resistant	Fair fire resistance in spots	Parts CC due to species	Poor distribution canopys. Might work in some parts
27-2-43	57-58	no	yes	Some Sanitation/ Salvage commercial thin	Poor species mix for Shelterwood	Fair fire resistance in spots	Parts CC due to species	Poor distribution canopys - work in small parts
27-2-44	70	no	no - part	No - would go to regeneration	Yes - light trees/acre - aspect needs	Good leave trees	Aspect/elevation not best for clear cut	poor species
27-2-55	66	no	no - sold	Just cut clear cut with reserve (visuals) Program OSR in 7 to 10 years				
27-2-71	67	no	sold	Cultural work prescription says Clear cut				
27-2-78	60	No info						
27-2-89	69	no	sold	Reserve trees for visuals and wildlife per perscription				
27-2-90	64	no	sold	schedule OSR 6 to 10 years post harvest				

Stand	Unit	Currently Target?	Defer?	Modified	Shelter Wood	Seed Tree	Clear Cut	Uneven-Aged
27-2-100		no	sold	SW - schedule OSR 8 to 10 years post harvest				
27-2-18	130	no - Old LP	no	Basal Area Thin (Poor Growth)	Scarce numbers fire resistant	Good leave trees	System would work	Very poor species
27-2-19	128 132	no young	yes	commercial thin/ Sanitation Salvage	Too young ---> Good species and numbers	-------------> Good leave	-----------> would work	canopy distribution poor. Age in favor.
27-2-26	131	no young	no	Sanitation/Salvage commercial thin (good growth)	Too young ---> Good species and numbers	-------------> Good leave	------------> would work	Poor canopy distribution. Age in favor.
27-5-01	41, 42, 115	no	no	no	Larch has mistletoe low tree numbers	Fair number of trees	Would work	Mistletoe. Poor canopy distribution
27-5-03	40	no young	yes	Commercial Thin Sanitation/Salvage (excellent growth)	Too young ---> Good tree numbers --> DF	-------------> Good tree numbers	--------------> Would work	strongly even-aged young enough to develop
27-5-05	122	no old	yes	no Sanitation/ Salvage (Poor growth)	Lacks number fire resistant	Fair number seed trees	Would work well	Poor canopy distribution. Poor species
27-5-10	44	no insect risk	no	Sanitation/Salvage - Mountain Pine Beetle	Low number trees fire resistant	Good tree numbers	Would work well	Poor canopy distribution. Stand age against
27-5-12	120	close	yes	Partial cut risky --> species must be light	Several entry. No burn might work	Windthrow risk	Would work in small units	has some potential

Stand	Unit	Currently Target?	Defer?	Modified	Shelter Wood	Seed Tree	Clear Cut	Uneven-Aged
27-5-17	121	no young	no Mountain Pine Beetle	Basal Area thin Mountain Pine Beetle (excellent growth)	Too young ---> Poor species leave - windthrow	-------------> Fair seed trees	-------------> would work well	poor canopy dist windthrow
27-5-26	71	no Mountain Pine Beetle	no	Basal Area thin Mountain Pine Beetle (good growth)	Too few numbers for fire	Fair numbers and size	best - species mix	poor species
27-5-48	121		no info					
27-5-70	68		no info					
30-1-12	17		no info					
30-1-13	28		no info					
30-1-17	27		no info					
30-1-29	16	no young	yes	commercial thin	too young ---> poor specie windthrow	-------------> small ST for burn	-----------> small units (20 ac) good	windthrow might work on part
30-1-31	116	yes	yes	commercial thin	poor species windthrow 3 to 4 entries	windthrow	20 ac units good - windthrow	wind throw risk. Strong even-aged hard to convert
30-1-33	116	yes	not long	risk stand breakup	windthrow. Slow 3 to 4 step	windthrow	20 ac units good - windthrow	Very hard to convert. Volume/density
30-1-36	15	no	no	no - poor growth	wind - slow 3-4 step Age --> risk	wind	20 ac units good	Very hard to convert - age
30-1-37	15	no	no	no - poor growth	wind - slow 3-4 step Age --> risk	wind	20 ac units good	Very hard to convert - age
30-2-01	119	no	no Mountain Pine Beetle	Basal Area thin (Poor growth)	poor species to SW	low number fire resistant trees	good option - species	poor species L-LP

Stand	Unit	Currently Target?	Defer?	Modified	Shelter Wood	Seed Tree	Clear Cut	Uneven-Aged
30-2-05	43	no	yes	yes commercial thin	too young ---> multi stage	------------> poor species to ST	-----------> 20 acre unit OK	if can get regeneration, would work --> AF
30-2-14	118	no	yes	low priority - remove LPP	too young ---> poor species low tree numbers wind	------------> minimum number trees for ST	-----------> due to species good	poor distribution canopys. species --> high log damage
30-2-16	31	no	no Mountain Pine Beetle	Basal Area thin or Sanitation Salvage	just larch for leave	good ST option	site takes CC alright	poor species to convert
30-2-17	31	no	no Mountain Pine Beetle	Basal Area thin or Sanitation Salvage	not enough fire resistant trees	minimum number trees for ST	site takes CC alright	cable ground - poor species
30-2-19	32 34 35 36	no	no	no - poorly stocked high site. some OSR chance	low tree numbers	fair tree numbers. need site preparation	excellent chance to plant WP	conversion leaves site poorly stocked.
30-2-20	25	no	no Mountain Pine Beetle	OSR	regeneration established	----------->	----------->	could be converted with some work
30-2-23	26	no	no Mountain Pine Beetle	OSR	regeneration established	----------->	----------->	could be converted with some work
30-2-32	29	no	yes	OSR	regeneration established	----------->	----------->	could be converted with some work
30-2-33	29	near	yes	Sanitation Salvage --> Mountain Pine Beetle	multi stage	wind risk	20 ac unit alright	strong even age wind risk
730-2-38	23	no - poor stock	no	some OSR - defer denser parts	tree numbers fire resistance may be tight	good tree numbers	good option to plant WP	stand could be converted
30-2-39	22 24	near	yes	Sanitation Salvage LPP	Too young —> fair number fire resistant	------------> good tree numbers	------------> good option to plant WP	stand could be converted

Stand	Unit	Currently Target?	Defer?	Modified	Shelter Wood	Seed Tree	Clear Cut	Uneven-Aged
30-2-36		no info						
30-2-37		no info						
730-3-01	14	no	no - WP	Sanitation Salvage	low numbers	fair numbers	good option to plant WP	could convert with work
30-3-02	18	no poorly	no - WP	may OSR	low numbers	good numbers	good option to plant WP	poor species to convert now
30-3-03	20	no information						
30-3-08	19	no poorly	no - WP	Sanitation Salvage or OSR	low numbers	fair numbers	good option to plant WP	could convert
30-3-09	21	no	no -WP	Sanitation Salvage	low numbers	good number fire resistant concentrate holes	good option to plant WP	difficult but might convert TPA/Vol
30-3-10	19	no	no - WP	Sanitation Salvage	low numbers	good number concentrate holes	good option to plant WP	could convert
30-3-11	21	no info						
35-1-09	9	no	no - LPP	Sanitation Salvage	too young ---> good numbers	------------> good numbers	----------->	could convert
35-1-10	110	no info						
35-1-13	47	no	yes	recent CC				
35-1-14	47	no	no	OSR when certified				
35-1-15	48	no	no	OSR when certified				
35-1-18	8	no	yes	Sanitation Salvage	not enough good trees	minimum number good trees	good option to plant WP	cable - poor species too old
35-1-30	46	no	no	OSR when certified				
35-1-32	10	no	yes	commercial thin	too young ---> could SW	----------->	-----------> too rocky	good chance to convert

Stand	Unit	Currently Target?	Defer?	Modified	Shelter Wood	Seed Tree	Clear Cut	Uneven-Aged
35-1-42	106	no	yes good growth	Sanitation Salvage	reasonable number fire resistant	good number trees	may be shallow soils	cable - lacks young class
35-1-43	7	no	no high damage	Sanitation Salvage	wind - too few numbers	minimum number trees	good option to plant WP	wind - high defect strong even
35-1-47	11 12	no	no Mountain Pine Beetle	Basal Area thin	species no trees	below minimum number	good option to plant WP	species
35-1-67	104	no information						
35-1-78	13	no information						
35-1-53		no	no - LPP	Basal Area thin	not enough trees	just enough trees	good option	strongly even
35-2-01	1	no	yes	OSR in lightest stocked areas	not necessary	not necessary	not necessary	could develop multi aged
35-2-02	4	no	yes low volume	intermediate not appropriate	too young --->	------------>	------------>	poor species could develop except steep
35-2-07	102	no	yes	about one-half of stand could be commercial thin	too young --->	------------>	------------>	poor species take a lot of work to convert
35-2-09	2	no	yes	commercial thin	too young --->	------------>	------------>	poor stock small. could develop uneven. cable!
35-2-13	6		no data					
35-2-45	5	no low stock	yes	high disease damage	minimum number fire resistant	fair numbers	shallow soils may need Nat	cable - defect
35-2-65	3	no low stock	yes	low priority commercial thin part	too young -->	------------>	------------>	cable? poor species
738-2-20	49,50		(Queen Mtn	sale - not enough	information)			
38-2-23	52		(Queen Mtn	sale- not enough	information)			

Stand	Unit	Currently Target?	Defer?	Modified	Shelter Wood	Seed Tree	Clear Cut	Uneven-Aged
38-2-26	52	no	yes	no - lightly stocked	a little young low numbers to do right. may be needed	-------------> fair numbers	------------> bad aspect and slope	poor canopy distribution steep
38-5-30	127		no information					
38-5-43	53		no information					
38-5-37	55	no	yes	Mature Salvage	not good ----> species, cable	------------>	good option	possible root rot in AF. Cable
38-5-64	54	no	yes	Salvage - high mortality	poor species >	------------>	good option	too old
38-5-65	54		no information					
38-5-97	53		no information					
	56	no	yes	Mature Salvage	Would need prep cuts species	------------>	good option	too old, strong even

EXPLANATION AND DEFINITION OF WEST MOYIE SILVICULTURAL METHODS ASSESSMENT

This table was used to document the thinking process that silviculturist Bosworth used in assessing the appropriate treatments that could be considered for each stand being proposed in the analysis area. The table was then used to evaluate the various treatment systems that were proposed in the alternatives produced.

All assessments were made from inventory data in the district stand records (see stand records in the project file). Inventory plots and computer tabulations of the plot information were reviewed to determine the stands capabilities to sustain the variety of silvicultural systems available to be used, or being considered for the stand.

As each stand was reviewed, the silviculturist asked a series of questions of the data, and noted enough as a remark to each question to recall the driving factor for each column in the table. The standard 7 questions asked were:

1. CURRENTLY TARGET? Is the stand presently in target condition?
2. DEFER? Is the stand presently in a condition that it can be deferred from any harvest entry for 10-20 years without serious mortality potential from insect and/or disease?

3. MODIFIED? Is stand condition such that intermediate harvest, rather than regeneration harvest can be accomplished? Intermediate harvests include sanitation/salvage, commercial thinning and removal (OSR) of seed or shelter trees.

The last 4 questions pertain to regeneration options in the stand.

4. SHELTERWOOD? Does the stand have a composition suitable for a successful shelter cut to be implemented on the site?

5. SEED TREE? Does the stand have a composition suitable for a successful seed tree cut to be implemented on the site?

6. CLEARCUT? Is the clearcut regeneration system appropriate in this stand?

7. UNEVEN-AGED? Does the stand have conditions such that the single tree selection system can be successfully implemented.

DEFINITION OF NOTES TO THE 7 QUESTIONS

CURRENTLY TARGET. The Bonners Ferry District uses as a standard target condition a model stand generally at the age the first commercial thinning would be considered, and characterized by the size and numbers of trees that would be left in the stand following the commercial thinning. This model stand is based on normal yield tables for existing species and site index.

Most stands in this analysis are older than the target condition, and many have insect and disease implications because of their age. Some of the younger stands are poorly stocked, and therefore do not meet the model target stand.

DEFER. Two conditions are noted in this column. Many of the stands are at high risk to mountain pine beetle attack on the lodgepole pine. Some stands have a substantial component of white pine which is at risk to mortality from blister rust.

MODIFIED. In this column, if intermediate harvest is not recommended, a reason is stated. If intermediate harvest is recommended, the type is noted.

SHELTERWOOD AND SEEDTREE. Stand data was looked at to determine if there were enough good trees at least 12 inches DBH, and of a species capable of withstanding underburning (larch, Douglas-fir or ponderosa pine) to have a successful system. The numbers of trees were minimum 25/acre for shelterwood and 15/acre for seedtree. Although tree numbers is not a definitional distinction between the two systems, the common perception is that there will be more trees left in a shelterwood than in a seedtree cut.

If machine piling or some other non-broadcast burning method of slash disposal can be accomplished, it is assumed that the species limitations noted in the comments will not apply. In some cases it was apparent that machine piling would be an option, but the only species available for seed/shelter are prone to windthrow, and this is noted.

CLEARCUT. Notes here indicate why clearcutting is appropriate or inappropriate. Notes that indicate the system to be appropriate include: species, windthrow, chance to plant WP. Notes indicating the inappropriatness of clearcutting include: too rocky, shallow soils, aspect and slope and not needed.

UNEVEN-AGED. Where the silviculturist felt that single tree selection system could be successfully employed in the stand, that is so noted. It is assumed that group selection can be implemented in most stands, as it has some characteristics similar to the even-aged systems.

There are a number of reasons that single tree selection is apt to fail in these stands, and the short notes indicate the concern:

"Cull, High defect or Root rot". The amount of fungal indicators in the entire stand jeopardize the long term productivity of a selection system. The cull and defect would be likely to leave a stand with no merchantable products. The preesence of root rot in the stand would jeopardize the survival of the most probable species to regenerate under this system.

"Poor species mix". Many stands are neary pure lodgepole pine. It is not recommended to try the selection system in this timber type.

"Strong even character", or "lacks young class", or "poor distribution canopy". Some stands develope with a very uniform canopy level, with virtually all the trees in the stand being the same age. In these stands there is little or no understory to give the requisite differentiation that is a part of the selection system. When stands reach older ages and they are still in this condition, it is very difficult to create new age classes successfully.

"Mistletoe". If the tallest trees in a stand have mistletoe, shorter trees are very likely to be infected. When seedlings or saplings become infected, they may never grow to sawlog size due to the growth reductions caused by the pathogen.

"Windthrow". Some species are highly susceptible to windthrow if opened up to the amount that is required for the selection system to function.

"Hard to convert-vol/density or age". Worldwide experience has been that it is very hard to convert high volume very dense stands, or very old even-aged stands to an uneven-aged condition. Failure probability is high.

"Cable ground" or "steep". Steep ground must usually be logged with cable yarding systems. Historical experience has been that these systems can not be employed in true selection system situations due to the severe logging damage to the young and small trees.

Timber Sale Contract Clauses

C5.23# - Control of Construction. (6/78)
Unless otherwise agreed in writing, Specified Roads listed below shall be completed within the same Normal Operating Season as started, except as follows:

1. Construction or reconstruction shall be accomplished in such a way that not more than XXXXX feet will be in less than Substantially Completed condition at the end of any Normal Operating Season.

2. No pioneer road or Temporary Road construction shall be allowed outside the Normal Operating Season unless agreed to in writing by Forest Service.

Control of Construction List (C5.23#)

Road Number	Termini

C5.46 - Snow Removal. (10/82)
Snow removal shall be done in a manner to preserve and protect the roads, to the extent necessary, to insure safe and efficient transportation and to prevent excessive erosion damage to roads, streams, and adjacent lands.

1. Description. Snow removal work by Purchaser shall include:

   a. Removal of snow from entire road surface width including turnouts.

   b. Removal of snow slides, earth slides, fallen timber, and boulders that obstruct normal road surface width.

   c. Removal of snow, ice, and debris from culverts so that the drainage system will function efficiently at all times.

2. Performance. All items of snow removal shall be done currently as necessary to insure safe, efficient transportation. Work shall be done in accordance with the following minimum standards of performance.

   a. Removal of material. All debris, except snow and ice, that is removed from the road surface and ditches shall be deposited away from stream channels at agreed locations.

   b. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface.

   c. Ditches and culverts shall be kept functional during and following roadway use.

   d. Snow berms shall not be left on the road surface. Berms left on the shoulder of road shall be removed and/or drainage holes shall be opened and maintained. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodible fills.

e. Dozers shall not be used to plow snow on system roads without written approval of Forest Service.

f. Snow must not be removed to the road surface. A minimum two-inch depth must be left to protect the roadway.

g. Purchaser's damage from, or as a result of, snow removal shall be restored in a timely manner.

C6.341 - Prevention of Oil Spills. (6/81)
If Purchaser maintains storage facilities for oil or oil products on Sale Area, Purchaser shall take appropriate preventive measures to insure that any spill of such oil or oil products does not enter any stream or other waters of the United States or any of the individual States.

If the total oil or oil products storage exceeds 1,320 gallons or if any single container exceeds a capacity of 660 gallons, Purchaser shall prepare a Spill Prevention Control and Countermeasures (SPCC) Plan. Such plan shall meet applicable EPA requirements (40 CFR 112) including certification by a registered professional engineer.

C6.6# - Erosion Prevention and Control. (11/74)
A. Purchaser shall locate Temporary Roads according to operating schedule, B6.31. Such location shall include the marking of road centerline or grade-line and the setting of such construction stakes as are necessary to provide a suitable basis for economical construction and the protection of National Forest lands. Maximum sustained grades for Temporary Roads shall be XXXXX percent.

B. Skidding with tractors within XXXXX feet of live streams shall not be permitted except in places designated in advance by Forest Service, and in no event shall skid roads be located in live or intermittent Streamcourses. Skid trails shall be located high enough out of draws, swales, and valley bottoms to permit diversion of runoff water to natural undisturbed forest ground cover.

C. During periods of accelerated water runoff, especially during the spring runoff and periods of heavy rainfall, Purchaser shall inspect and open culverts and drainage structures, construct special cross ditches for road runoff, and take other reasonable measures needed to prevent soil erosion and siltation of streams.

D. Tractor skid trails in excess of XXXXX percent shall be permitted only upon written agreement.

E. Temporary Road surface width shall be limited to truck bunk width plus 4 feet, except for needed turnouts which shall not exceed two times the bunk width plus 4 feet. If shovels or cranes with revolving carriage are used to skid or load, Temporary Road surface width equal to track width plus tail swing shall be permitted.

F. Unless otherwise agreed in writing, Purchaser shall keep erosion control work current with his operations under the sale and in any case not later than 15 days after completion of skidding on each unit or subdivision.

C6.601# - Erosion Control Seeding. (3/89)
Following completion of skidding and yarding operations in an area, Purchaser shall seed XXXXX and fertilize XXXXX those exposed areas of critical raw soil on skid trails, landing, firebreaks, Temporary Roads and traveled ways of Specified Roads #XXXXX, #XXXXX, following closure specified in C5.51#. Soil on areas to be seeded shall be left in a roughened condition favorable to the retention and germination of the seed.

Scarification of travelled ways on Specified Roads listed above shall be to a minimum depth of XXXXX inches and a maximum depth of XXXXX inches.

Seed XXXXX and fertilizer XXXXX shall be spread evenly at the rate of XXXXX pounds of seed and XXXXX pounds of fertilizer per acre.

When fertilizer and seed are applied in separate operations, the second operation shall be carried out within 72 hours of the first.

Application shall be during the period XXXXX to XXXXX unless otherwise approved. No application work shall be done during extremely windy or rainy weather, or when the ground is frozen or otherwise unsuitable.

The kinds and amounts of seed to be sown in terms of live pure seed shall be:

Species of Seed	Pounds Per Acre
____________	____________

The following kinds and amounts of standard commercial fertilizer shall be used with guaranteed analysis of contents clearly marked on containers:

Type of Fertilizer	Pounds Per Acre
____________	____________

C6.602# - Erosion Prevention and Control. (3/89)
During periods of accelerated water runoff, especially during the spring runoff and periods of heavy rainfall, Purchaser shall inspect and open culverts and drainage structures, construct special cross ditches for road runoff, and take other reasonable measures needed to prevent soil erosion and siltation of streams.

In addition to the measures described above, Purchaser shall construct and maintain, at all times, cross ditches on those portions of the road segments listed below that are over the designated percent grade, and that are not in use.

Cross ditching of these road segments will be in place each year by XXXXX to assure construction prior to road freezing. Cross ditches shall be constructed by cutting a dip at least 4 inches deep in the road surface and mounding the excavated material along the lower edge of the dip. Dips will be constructed so they can be driven over. Cross ditches will be aligned approximately 90 degrees to the center line of the road and cross the entire width of the roadbed.

Road	Segment	% Grade	Maximum Spacing
____	______	______	____________

C6.24# - Protection of Cultural Resources. (4/84)
Location of known historic or prehistoric sites, buildings, objects, and properties related to American history, architecture, archaeology and culture, such as settler or Indian artifacts, protected by American Antiquities Act of 1906 (16 U.S.C 431-433), National Historic Preservation Act of 1966 (16 U.S.C 470) and the Archaeological Resources Protection Act of 1979 (PL 96-95 and 36 CFR 261.9(e)) shall be identified on the ground and/or shown in the Sale Area Map. Forest Service may unilaterally modify or cancel this contract to protect an area, object of antiquity, artifact, or similar object which is or may be entitled to

protection under these Acts regardless of when the area, object or artifact is discovered or identified. Discovery of such areas or objects by either party shall be promptly reported to the other party.

In the event of contract modification under this Subsection, Purchaser shall be reimbursed for any additional protection required, provided that any work or extra protection required shall be subject to prior approval by Forest Service. Amount of reimbursement shall be determined by Forest Service and shall be in the form of a reduction in stumpage rates unless agreed otherwise in writing. However, in no event may stumpage rates be reduced below Base Rates. Purchaser shall protect XXXXX all known and identified historic or prehistoric sites, buildings, objects, and properties related to American history, architecture, archaeology and culture against destruction, obliteration, removal or damage during Purchaser's Operations. Purchaser shall bear costs of restoration in accordance with 36 CFR 296.14(c), provided that such payment shall not relieve Purchaser from civil or criminal remedies otherwise provided by law.

Wheeled or track-laying equipment shall not be operated within such areas except on roads, landings, tractor roads or skid trails approved under B5.1 and B6.422. Unless agreed otherwise, trees will not be felled into such areas. Purchaser may be required to backblade skidtrails and other ground disturbed by Purchaser's Operations within such areas in lieu of cross ditching required under B6.6.

C6.25# - Protection of Habitat of Endangered Species. (6/78)
Location of areas needing special measures for protection of plants or animals listed as threatened or endangered under the Endangered Species Act of 1973 are shown on Sale Area Map and identified on the ground. Measures needed to protect such areas have been included elsewhere in this contract or are as follows: XXXXX

If protection measures prove inadequate, if other such areas are discovered, or if new species are listed on the Endangered Species List, Forest Service may either cancel under C8.2 or unilaterally modify this contract to provide additional protection regardless of when such facts become known. Discovery of such areas by either party shall be promptly reported to the other party.

In the event of contract modification under this Subsection, Purchaser shall be reimbursed for any additional protection required by the modification, provided that any work or extra protection required shall be subject to prior approval by Forest Service. Amount of reimbursement shall be determined by Forest Service using standard Forest Service rate redetermination methods in effect at time of agreed change and shall be in the form of a reduction in Current Contract Rates unless agreed otherwise in writing. However, in no event may Current Contract Rates be reduced below Base Rates.

C6.34 - Sanitation and Servicing Within Municipal Watershed. (10/71)
A. Camps shall be located completely out of the watershed.

B. At landings and other areas where crews are located, Purchaser shall provide sanitation facilities.

C. Portable waste containers, for disposal at an approved location outside the watershed, shall be provided for all crews. These shall be plastic receptacles or oil drums which can be removed from the watershed and the container and contents buried or the container cleaned and contents buried at designated locations. Toilets shall be equipped with seats and self-closing covers. Chemicals for odor and fly control shall be provided to assure that the facilities will be used. A disinfectant will be used at point of disposal by burial.

D. Fuel, oil, and equipment waste shall not be allowed to enter ditches, intermittent stream channels or live streams.

E. During periods of operation all areas used shall be policed daily for wastes and refuse. At points of burial finished surfaces over compacted fills shall be shaped and treated to prevent ponding and erosion.

C6.61# - Wetlands Protection. (5/84)
Wetlands subject to this provision are shown on Sale Area Map. Vehicular or skidding equipment shall not be used in such setlands except where roads, landings, and tractor roads are approved under B/BT5.1 or B/BT6.422.

Additional measures needed to protect such wetlands have been included elsewhere in this contract or are as follows: 1/

APPENDIX B

Reply to: 2670 TES species

Date: April 2, 1991

Appendix B.
Biological Evaluation For Sensitive Plants. West Moyie FEIS.

INTRODUCTION

This biological evaluation addresses the area identified as the Decision Area in the West Moyie Final Environmental Impact Statement. It addresses plants listed as sensitive by the Regional Forester for the Idaho Panhandle National Forests. The U.S. Fish and Wildlife Service lists no threatened or endangered plants as occurring in the Decision Area. (Reference letter: 1-4-89-SP-205). This biological evaluation is prepared in accordance with direction provided in Forest Service Manual (FSM) 2672.42.

FIELD SURVEY RESULTS

Providing field clearances for proposed timber sales are accomplished through sensitive plant surveys. Floristic surveys covering a portion of the Decision Area have been conducted as cooperative cost share projects between the Idaho Panhandle National Forests and the Natural Heritage Section of Idaho Fish and Game. These surveys involved wetland habitats (Moseley, 1989) and the genus *Botrychium* (Moseley and Lorraine, 1990). In addition, floristic surveys have been conducted for a proposed expansion of the existing Pacific Gas Transmission pipeline (Taylor, 1990).

A majority of the areas involved in the proposed alternatives were surveyed by Forest Service Biologists for sensitive plants including tentative road and unit locations for Alternative J2. (Norris, 1990 and Sieracki, 1990). This alternative was selected for the general surveys because it contains a substantial number of units and road locations that would be utilized in the selected alternative.

The *Sensitive Plant Field Guide, Idaho Panhandle National Forest - Kaniksu National Forest*, 1989, and *Caring for Our Natural Community: Region 1, Threatened, Endangered, and Sensitive Species Program*, 1989, provided the list of the sensitive species looked for during general surveys. Species listed under the various categories established by the Idaho Native Plant Society including Federal Candidate Taxa; Idaho State Priority 1 Taxa; Idaho State Priority 2 Taxa; Idaho State Sensitive Taxa; Idaho State Monitor Taxa; and Idaho State Review Taxa (Moseley and Groves, March 1990) were also noted if found. Although the Forest Service has no legal responsibility to abide by the Idaho Native Plant Society listings, these lists often provide the basis for additions to the Regional Sensitive Plant List.

Wool Grass (Scirpus cyperinus)

Status: USFWS: none
USFS Region 1 Status: Sensitive in Idaho.

Identification of occupied habitats

Wool-grass is distributed throughout the boreal regions of the northern hemisphere, extending south in North America to Connecticut, Michigan, Saskatchewan and northwest Montana and northern Idaho. In Idaho, wool-grass is currently known from 14 sites in Latah, Kootenai, Benewah, Bonner and Boundary Counties. (Moseley, 1990a)

During October, 1990, a population of wool-grass was located in the West Moyie Decision Area. This group of 6-10 individuals is growing along road 2485 in a moist drainage ditch 2-300 feet south of the junctions of roads 2485 and 2268 (Sieracki, 1990). This is the only known population in the Northwest corner of the Bonners Ferry Ranger District.

Effects and cumulative effects of the proposed action

Potential effects to the wool-grass population include:

1. Crushing of plants by recreational and logging traffic slipping off of the road surface and into the ditch.

2. Incursion of road grading activities which would destroy the site where the plants are located.

3. Damage to plants and their habitat from road oiling.

4. Possible introduction of weedy plant species.

4. Damage to plants from herbicide application used in control of noxious weeds.

Conservation Measures for Avoiding Potential Adverse Impacts to Wool Grass

1. Avoidance of impact to the population. This will be accomplished through:

   A. Installation of a permanent marker of the sensitive plant site.

   B. Inclusion of the location in road maintenance logs in order to prevent accidental loss from road grading.

   C. Inclusion of the location on sale area maps and information sharing with the sale area administrators.

There are several species which have a possibility of occurrence in the Decision Area which were recommended to the Regional Forester for addition to the Sensitive Species list. They are listed in the Chapter 3, table 3-7 page 3-62. A map of sensitive and rare plant species can also be found in Chapter 3 figure 3-16 page 3-63 of the FEIS.

Soft Rush (Juncus effusus var. pacificus)

Status: USFWS: None
USFS Region 1: Sensitive in Idaho

Identification of occupied habitats

Soft rush is distributed mainly to the west of Region 1 and has been recorded from summits in the Cascade mountains of the Pacific Coast. A disjunct population occurs in the Northern Region of the Forest Service on the Clearwater National Forest (Reel, 1989). Additional locations have been identified in the Moyie River Valley of Boundary County, Idaho by Bob Moseley, D.W. Taylor and Paul Sieracki. The Moyie River valley population is located on the Bonners Ferry Ranger District at T64N, R3E, SEC3, EAST 1/2 west of Sinclair Lake.

The population is growing in a small wetland complex located in an old homestead clearing. It is associated with Carex flava, Holcus lanatus, Pinus contorta, Salix cf. candida, Equisetum sp., E. arvense, Stellaria calycantha, Prunella vulgaris and Agrostis stolonifera (Moseley, 1990).

Another population, located 0.75 miles north of Snyder guard station, is located on private land. The population is located approximately 0.1 mile west of unit 21 of the West Moyie EIS and is likely to be impacted by the pipeline expansion. Mitigation for this population on private land , possibly involving transplanting, is discussed in Taylor, 1990.

Discussion of Effects and Cumulative Effects.

Potential effects to the population of soft rush can occur from two activities; the West Moyie Timber Sale and the Kizer Special use grazing permit.

Potential effects to this population from the West Moyie EIS include:

1. Direct damage to the soft rush from timber removal by skid trails and utilization of the meadow for a helicopter landing.
2. Possible introduction of invasive plant species brought in by administrative and logging equipment which would displace the soft rush.

Potential effects to this population from the Kizer Special Use Grazing Area include:

1. Direct damage to the plants from grazing.
2. Direct damage to the plants and wetland from trampling.
3. Introduction of invasive plant species such as Reed Canary Grass (Phalaris arundinacea), Common Reed (Phragmites communis) and

Purple loostrife (Lythrum salicaria) which could potentially displace the rush.

4. Alteration of wetland hydrology.

Conservation Measures for Avoiding Potential Adverse Effects to the Soft Rush.

1. The soft rush would not be directly impacted by the West Moyie Timber Sales. The skid trails needed to access units 33, 34, 35, and 36 will utilize existing trails, not impacting any of the existing meadow and associated wetlands. The helicopter landing would be located on an existing airstrip, well away from the soft rush locations.

2. The potential introduction of invasive species from logging operations and the special use grazing permit would be monitored through the noxious weed program and also through periodic monitoring directly associated with the soft rush population.

3. Maintenance of the livestock exclusion fencing will be completed on a yearly basis, before the introduction of the livestock for that year.

4. Monitoring plan for the soft rush population. This will be accomplished through the following monitoring plan.

   Year 1: Count, photograph and map the existing plants. Complete ocular macroplots to characterize the habitat of the rush. Enter the plot data. Search the grazing area for additional locations. Review the PGT proposal and integrate the two monitoring plans.

   Year 3 and every third year after that: recount and map the plants, and search for the presence of potentially invasive species. If monitoring indicates a decline in the population, develop a site specific management plan.

   Yearly: Check that the exclosure maintenance has been completed before livestock introduction.

   Funding Sources: Funding will be provided through the range program and KV from the West Moyie EIS.

This section of the biological evaluation will replace the existing BE for the Kizer Special Use Grazing Permit.

Determination of Effect

If the conservation measures are implemented as outlined above, the proposed timber management and grazing activities are **Not Likely to Adversely Affect** Juncus effusus var. pacificus.

2. Monitoring of the population. This will be accomplished through.

Year 1: Count, photograph and map the existing plants. Complete ocular macroplots to characterize the habitat of the wool-grass. Enter the plot data.

Year 3 and every third year after that: recount and map the plants, and search for the presence of potentially invasive species. If monitoring indicates a decline in the population, complete an additional evaluation and develop a site specific management plan if deemed necessary.

Yearly: Check that markers for the wool-grass population are in good condition just after snow melt when the road has been opened by district personnel.

Funding Sources: Funding will be provided through KV from the West Moyie EIS.

Determination of Effect

If the conservation measures are implemented as outlined above the proposed timber management and future road maintenance activities are Not Likely to Adversely Affect <u>Scirpus</u> <u>cyperinus</u>.

Wool-grass has been recommended for removal from the Region 1 Sensitive species list for the State of Idaho (will still be listed for Montana). However, it is sufficiently rare in Idaho to warrant inclusion on the Idaho Native Plant Society's Monitor List (Moseley 1990a). Since this is the only known population in the northwest portion of the district, and the population could be extirpated by road maintenance and timber harvest activities, monitoring and protection of this population will continue (Continuation of monitoring was also requested by Idaho Natural Heritage)..

Additional field clearances needed and year

Although general surveys have been conducted using alternative J2 as a guide, site specific surveys need to be conducted in areas of likely habitat for the proposed additions to the sensitive species list and in areas where road and unit locations have been modified for the selected alternative as identified in the Record of Decision. These areas include; surveys along the exact location of roads (along p-lines), skid trails, and in new or modified harvest units after they are flagged in. Road location and unit layout activities are scheduled to take place the summer of 1991. Field clearances should be conducted during this time.

/s/ Paul Sieracki
Paul Sieracki
Wildlife Biologist

List of People Consulted

Jill Blake, Botanist for the Idaho Panhandle National Forests, Coeur d'Alene, Idaho.

Bob Moseley, Plant Ecologist for the Natural Heritage Section of Idaho Fish and Game, Boise, Idaho.

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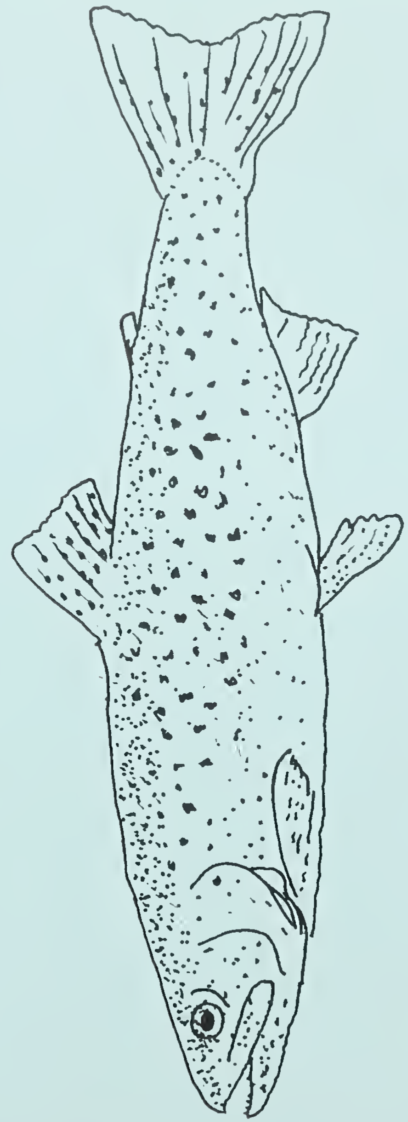
SPECIES	HABITAT	ELEVATION	SUBSTRATE	BLOOM PERIOD	INHP STATUS	FEDERAL
Adiantum pedatum var. novum	rocky, subalpine areas	7200' - 9000'	moist skeletal soils	spores July, August	G5T1Q/S1	-
Allotropa virgata	deep humus,decomposed logs in woods	2300' - 6700'	deep humus	May - August	G4/S1	-
Arnica alpina var. tomentosa	bare, rocky alpine slopes & summits	7200' - 9000'	moist skeletal soils	July, August	G5T5/S1	-
Betula pumila var. glandulifera	sphagnum bogs, peatland fens	1700' - 2700'	wet, organic peats	May, June	G?/S2	-
Blechnum spicant	moist, dense cedar/hemlock forests	2000' - 3500'	moist mineral	spores July, August	G5/S2	-
Botrychium minganense	old growth forests, meadows, forest	2500' - 4800'	moist, gen. acidic	spores July, August	G4/S1	-
Carex chordorrhiza	saturated peatlands	1700' - 2700'	wet, organic peats	May - July	G?/S1	-
Carex comosa	saturated peatlands, in water	1700' - 2700'	wet, organic peats	May - July	G5/S1	-
Carex leptalea	saturated peatlands	1700' - 2700'	wet, organic peats	May - August	G?/S1	-
Carex paupercula	sphagnum bogs, fens	1700' - 2700'	wet, organic peats	May - July	G5/S2	-
Cicuta bulbifera	marshes, bogs, wet meadows	1700' - 2700'	wet, organic peats	July, August	G5/S1	-
Cypripedium calceolus var.p	bogs, moist forest-meadow borders	3000' - 6000'	moist, organic	May, June	G5T5/S1	-
Dryopteris cristata	moist, boggy woods to wet meadows	1000' - 2500'	moist, organic	spores July, August	G5/S2	-
Epilobium palustre	edges of sphagnum bog mats	1700' - 2700'	wet, organic peats	July, August	G?/S1	-
Epipactis gigantea	warm water springs, seeps & streams	2900' - 4900'	moist calcareous	July, August	G4/S3	-
Eriophorum viridicarinatum	swamps, bogs, wet meadows	2000' - 4000'	moist, organic	June, July	G?/S1?	-
Gaultheria hispidula	alder swamps on sphagnum moss	2500' - 3000'	wet sphagnum	May, June	G5/S2	-
Howellia aquatilis	small vernal (seasonal) ponds	-	water	May - July	G2/S1	C1
Hypericum majus	marshes, bogs, wet meadows	1700' - 2700'	wet, organic peat	July - September	G5/S1	-
Juncus effusus var. pacificus	bog-like areas near streams & ponds	1700' - 3500'	moist, organic	July - August	G5T5/S3	-
Lycopodium inundatum	sphagnum bogs	2400' - 3000'	wet sphagnum	July, August	G5/S1	-
Lycopodium sitchense	meadows & open rocky places in mtns	4000' - 9000'	moist skeletal,duff	July, August	G5Q/S1	-
Maianthemum dilatatum	shaded, moist streambanks in cedar	2400' - 3000'	moist, organic	May - June	G4/S1	-
Muhlenbergia glomerata	moist to wet sphagnum bogs	3000' - 3600'	moist sphagnum	July - September	G5/S1?	-
Nymphaea tetragona	in ponds and lakes	1700' - 2500'	water	June - August	G5/SH	-
Oxalis trillifolia	alluvial terraces along streambeds	2000' - 4000'	moist alluvium	May - August	G5/S1	-
Rhynchospora alba	sphagnum/shrub wetland communities	1700' - 2700'	wet organic peat	July - August	G?/S1	-
Romanzoffia sitchensis	wet cliffs and ledges in mountains	3000' - 9000'	moist,mossy bedrock	June - August	G4/S1	-
Rubus pubescens	streambanks, moist woods, clearings	2000' - 3500'	moist to dry organic	May - early June	G5/S1	-
Rubus spectabilis	moist woods,streambanks,mtn slopes	1500' - 3000'	moist organic	March - June	G5/SH	-
Salix pedicellaris	bogs and boggy meadows	1000' - 2700'	moist organic peats	May - June	G5/S1	-
Sanicula marilandica	wet meadows, marshes, streamsides	1000' - 2500'	wet to moist organic	June, early July	G5/S1	-
Scirpus subterminalis	quiet, shallow water	1700' - 2700'	water, wet organic	July, August	G4-5/S1	-
Streptopus streptopoides var.b	mature cedar & hemlock forests	2000' - 4000'	moist organic soils	July - August	G5T4/S1	-
Tellima grandiflora	along streams in woods	1000' - 2500'	gen. rich organic	April - July	G5/S?	-
Thelypteris phegopteris	cliff crevices,moist banks in woods	2000' - 4000'	moist soils	spores July, August	G5/S1	-
Tofieldia glutinosa ssp. absona	sphagnum bogs, pond edges	1000' - 2500'	wet organic peat	July, August	G5T1/S1	C2
Trientalis arctica	sphagnum bogs, moist meadows	2400' - 5000'	wet shpagnum	May - August	G4/S3	-
Vaccinium oxycoccus	sphagnum bogs	2400' - 2900'	wet sphagnum	May - July	G5/S1	-
Viola sempervirens	moist, shaded woods	1000' - 3500'	moist forest soils	May - June	G5/S3	-

APPENDIX C



United States Department of Agriculture | Forest Service | Idaho Panhandle National Forests | 1201 Ironwood Drive Coeur d'Alene, ID 83814

Reply to: 2500 Watershed

Date: March 12, 1990

Subject: West Moyie Further Analysis

To: District Ranger, Bonners Ferry Ranger District

A further analysis is required for the Hellroaring and Meadow Creek drainages within the West Moyie project area. The results of the IPNF sediment and fry emergence models indicate that current sediment production has resulted in fine sediment reducing fry emergence to less than 80 percent of potential. Appendix I of the Forest Plan requires that when the projected reduction in fry emergence is greater than twenty percent, a further analysis be conducted to confirm or alter the results of the Forest's fishery/watershed model. Based upon this analysis, the Forest watershed and fishery specialists will provide the line officer with their best professional judgement on the significance of the project on the water resource. The following discussion will constitute the further analysis for these drainages.

1. HELLROARING CREEK.

Evaluation of the IPNF modelling procedure shows that it underestimates natural sediment and overestimates current sediment increases from past activities. The IPNF model estimates natural sediment to be 36.87 tons per year from Hellroaring Creek, or 6 tons per square mile per year. Research data suggest that 10 tons per square mile per year is the low end of the normal range for forested watersheds in the interior west. In contrast, the R1R4 estimate of 12 tons per square mile per year, or /3.7 tons from the watershed is a more realistic estimate of natural sediment from Hellroaring Creek. The IPNF model does not consider age of treatment and reductions of sediment production over time. Roads in the glaciated belt geology are modelled as producing 3.07 tons of sediment per road mile without consideration of the age of the road, slope where it is located, or distance from live water. The IPNF model predicts current sediment production to be 145 percent over natural resulting in 80% fry emergence success. The R1R4 model which begins with a more realistic estimate of natural sediment and considers age of roads, slope steepness, and sediment delivery and routing predicts current sediment to be 33 percent over natural.

<u>Professional judgement</u> is that the R1R4 model more accurately predicts sediment yield increases in this drainage. Current suspended sediment increases from roading and harvest are probably not degrading water quality. The emergence success curves are related to IPNF modelling and cannot be used with R1R4 results to predict fry emergence success.

An additional watershed concern in Hellroaring Creek is bedload transport and deposition in the lower reaches. The lower reach of this channel where Hellroaring Creek joins Round Prairie Creek is an alluvial fan. The top of the fan is at channel elevation 2840 feet, and the bottom is at 2720 feet. The fan was constructed over geologic time from bedload deposition coming out of Hellroaring Creek. Predictably, a stream channel may occupy any portion of an alluvial fan over time. In this case, however, there have been an unusually large number of channel shifts in recent time (last quarter century) as evidenced by the frequency and freshness of abandoned channels. Each shift was initiated by an episode of great bedload delivery to the fan resulting in plugging of the existing channel and the stream seeking a new channel. Other alluvial fans in north Idaho do not display the same fresh multiple channels. The conclusion is that this watershed is presently not in geologic equilibrium. It is not clear whether this is a result of unique geologic conditions, or is the result of increased peak flows from timber harvest. Water yield analysis indicates that the volume of water produced annually from this drainage has been increased by 6.13 percent. The northerly orientation and percent elevation above 4000 feet do not indicate that this watershed is especially vulnerable to rain on snow events or accelerated clear sky snowmelt. Therefore, it is not expected that the volumetric increase is reflected in disproportionately large increases in peak flow. Evaluation of the geomorphology of the drainage shows that the channel appears to be downcutting through a deposit of glacial till or moraine in the reach above the alluvial fan. From channel elevation 3100 to 3500 feet, the gradient of the channel is approximately 12 percent, and flattens to 6 percent above this. The glacial deposit is very likely composed of rounded cobbles, gravel, and smaller material that could easily be transported by Hellroaring Creek during high flows.

Professional judgement is that recent downcutting through the glacial deposit is responsible for most of the recent activity on the alluvial fan. Water yield increases from timber harvest may have contributed but to a lesser degree. The recommendation for future harvest is to limit volumetric water yield increases to less than eight percent, and to avoid creating openings in the canopy larger than five acres at elevations below 4500 feet which might contribute to rain on snow peaks.

2. MEADOW CREEK.

Suspended sediment production is also an issue is Meadow Creek. Again, the IPNF model predicted a large increase (147%) in natural sediment based on a low estimate of natural sediment (8.26 tons/square mile per year) and undiminished influence of 14 miles of road. In contrast, the R1R4 model estimates natural sediment to be 12 tons per square mile per year and current sediment to result in an 8 percent increase. The maintenance records of the Beeline water system strongly support the R1R4 model. The water intake had to be cleaned out with a backhoe during the mid 1970's (1974 - 1878). These were also years of road construction in this drainage. Subsequently, annual cleanout was done by hand with a shovel because of the small amounts of sediment. In recent years, this water system is generally acknowledged as having high quality of raw water at the intake. After consultation with Idaho Division of Environmental Quality,

it was agreed that sediment production must be kept below threshold amounts that will require cleaning the water system intake with a backhoe. The R1R4 model output indicates that sediment production in the mid 70's was 4 to 5 tons per square mile per year over natural (or 33 % over natural). Sediment production in more recent years is estimated by the model to be as high as 3 tons per square mile per year without evidence of sediment problems at the intake.

Professional judgement and with concurrence by IDEQ is that 3 tons per square mile per year is the limit of acceptable sediment increases for future management activity. Management options to achieve this include increased site-specific Best Management Practices such as filter windrows, scheduling road construction over time to reduce total sediment production in any one year, and changing the location of proposed roads to less erosive landtypes.

Professional judgement is that current high quality water at the water system intake is also fully protecting instream beneficial uses (fish). Any future activity that fully protects the domestic water supply of the Beeline water system will also protect fish habitat.

The selected alternative must be in compliance with Idaho's water quality standards which for nonpoint sources are collectively called the "feedback loop" As related to this project, compliance is based on whether the proposed activity (i) will comply with approved or specialized best management practices; and (ii) provides a monitoring plan which, when implemented, will provide information adequate to determine the effectiveness of the approved or specialized BMP's in protecting the beneficial uses of water; and (iii) provides a process for modifying the BMP's in order to protect beneficial uses of water. These requirements may be found in IDAPA 16.01.2300.04.c. Effectiveness monitoring could include continued streamflow and suspended sediment measurement, and stream surveys. As part of the environmental assessment, a process should be identified by which the BMP's will be modified where beneficial uses are not being protected as shown by monitoring results.

/s/gary b. kappesser

GARY B. KAPPESSER
Forest Hydrologist

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United States Department of Agriculture | Forest Service | Idaho Panhandle National Forests | 1201 Ironwood Drive Coeur d'Alene, ID 83814

Reply to: 2600 Fisheries
1950 NEPA Process

Date: February 20, 1991

Subject: West Moyie Further Analysis, Fisheries

To: District Ranger, Bonners Ferry Ranger District

In response to the further analysis required for the Hellroaring and Meadow Creek drainages within the West Moyie EIS project area, and after consultation with Gary Kappesser, Forest Hydrologist, and Ned Horner, Regional Fisheries Manager, Idaho Department of Fish and Game, and field reviews, I offer the following observations:

1. Fine sediment does not appear to be a problem in either stream relative to fish habitat.

2. The IPNF sediment model, upon which the fry emergence success curves are based, does not appear to provide a valid estimate of sediment production (Kappesser memo 1990).

3. The Forest Plan emergence curve for the Glaciated Belt geology has a very low correlation coefficient (Franzel memo 1989).

4. The R1R4 model estimates of sediment yield are significantly less than the IPNF estimates and are considered more more accurate (Kappesser memo 1990).

5. In my professional judgement the fry emergence figures generated for use in the West Moyie EIS should be considered as unreliable and not valid. The basis for this judgement is that the fry emergence curves can be used only with the IPNF sediment yield outputs which have been demonstrated to be of questionable validity. The R1R4 sediment yield values cannot be used with the Forest Plan fry emergence curves. The fry emergence values should probably be placed in an appendix with an explanation as to why the values are questionable and not in the main body of the EIS.

6. My professional judgement is that an evaluation of stream channel stability under existing and predicted conditions is a much stronger approach to evaluating fish habitat trends. If an alternative results in destablization of a particular stream channel then I believe fish habitat will in time be degraded, most probably by a reduction in pool depth which will result in reduced overwintering and rearing habitat.

7. Alternative B2 is the only alternative which would potentially result in stream channel destablization and thus result in potential negative changes in fish habitat. With this exception, I believe that none of the alternatives would result in measurable changes in fish habitat and that no cumulative impact to fisheries resources should be anticipated for the Moyie River drainage.

/s/david cross

DAVID CROSS
Forest Fisheries Biologist

cc: Dave Aldrich
Gary Kappesser
Allen Chrisman
Mark Grant

United States Department of Agriculture	Forest Service	Idaho Panhandle National Forests	1201 Ironwood Drive Coeur d'Alene, ID 83814

Reply to: 2500 Watershed

Date: February 11, 1991

Subject: Moyie River Channel Stability

To: District Ranger, Bonners Ferry Ranger District

The stability of the Moyie River as related to bedload transport has been raised as a concern by publics reviewing the West Moyie draft EIS. On February 7, 1991, a field inspection was made of the river channel to determine whether bedload is in fact a problem in this system. Participants included Forest Hydrologist Gary Kappesser, Forest Fish Biologist Dave Cross, NEPA Coordinator Darrell Frogness, and District ID team leader Mark Grant.

Field observations did not identify any fresh point or central bars in the river. No significant cut banks or other indications of instability were observed. Although no field measurements were taken, existing data from the U.S.G.S. stream gage at Eastport were used to calculate tractive force at bankfull discharge of 6530 c.f.s. Average force is 1.2 pounds per square foot which would initiate movement of bed materials as large as 59 millimeters (2.3 inches). By occular estimate, a significant percentile of size classes present are larger than this and would armor the bed at channel forming bankfull flows. Based on this evidence, it is therefore determined that the channel bed material is probably stable under the present flow regime and that a bedload problem does not currently exist in the river at this time.

The river channel is wider and shallower, and bed material size is more uniform than might be expected. This is due largely to historic log drives on the river with associated removal of large woody debris. Another factor is the glacial geology of the area, which once was a major proglacial meltwater sluiceway and outwash plain and may be responsible for the size distribution and roundness of the gravel and cobble in the river.

In my professional opinion, the cumulative effects of activities proposed in the West Moyie EIS on the Moyie River would be insignificant and immeasurable.

/s/gary b. kappesser

GARY B. KAPPESSER
Forest Hydrologist

TO: ALLEN CHRISMAN

FROM: DAVID CROSS

RE: HELLROARING CREEK

At your request I conducted a field review of Hellroaring Creek with Kelly Shanahan and Mark Grant on November 9, 1990. We observed the stream at three locations. The first two locations were in T65N R1E Sec31 the third in T64N R1E Sec 6. The first site was located at the head of the aluvial fan of the drainage. The channel substrate consisted of boulders and rubble, with small pockets of gravel. Fish habitat types consisted of pools and cascades with short sections of high gradient riffles. Streambanks were stable and the stream moderately confined at this point, and I classified this reach as a B-1 stream type.

The second site was approximately .5 miles upstream of the first. At this point the stream lies in a well confined valley and channel entrenchment is very deep. Channel materials are again boulders, cobble, and very little gravel. The inner gorge of the valley appeared to be very active with numerous active and recovering slides apparent. These seem to be naturally ocuring due to toe cutting by the high energy stream during high flow events. At this point I classified the stream as an A-3 channel, with poor gravel retention abilities and fish habitat types again were dominated by cascades and pools.

The third site was located at the lower end of a lower grade reach of stream, approximately .75 miles above the second site. At this point the stream channel consist of cobble bed with a mixture of gravel and sand and some small boulders. The channel is moderately entrenched and well confined. Stream grade was still high (>4%). Fish habitat types are more diverse in this reach and consist of high and low gradient riffles, debris formed pools and some runs. Spawning gravel is locally abundant. I classified this reach as a B-3 channel.

Throughout the stream I found the large woody debris component to be high, although in the A-3 channel and B-1 channel the stream has deposited most of it laterally to the channel. The productivity of the stream in terms of fish in the B-1 and A-3 channel reaches is probably limited due to the high energy of these reaches. As the grade is reduced and fish habitat types become more diverse the potential for fish production improves. I have no fish population data for the reach of stream above the A-3 channel reach, and my comments on productivity are based solely on channel fish habitat types. In the B-3 channel I would rate the fish habitat quality as high. I found no evidence of fish habitat degradation due to past management activities.

IPNF FOREST PLAN SEDIMENT MODEL

This model is described in Chapter 4 (page 4-25). As the previous memos discuss, the scientific validity of this model has been questioned by Forest Service and Idaho Department of Fish and Game fisheries biologists and hydrologists for the following reasons:

1. The model, upon which the fry emergence success curves are based, does not appear to provide a valid estimate of sediment production (Kappesser memo dated March 12, 1990).

2. The Forest Plan emergence curve for the Glaciated Belt geology has a low correlation coefficient (Franzel memo dated January 12, 1989; see project file).

Fine sediment does not appear to be a problem in the streams within the West Moyie Decision Area. The limiting factor to fish populations within the fishery streams within this area appears to be rearing and overwintering habitat, or pool quality and frequency. Stream channel stability under existing and predicted conditions is a much stronger approach to evaluating fish habitat trends. If an alternative results in destabilization of a particular stream channel then fish habitat will in time be degraded, most probably by a reduction in pool depth and frequency which would result in reduced overwintering and rearing habitat.

The following table depicting the emergence success based on this model is only presented because one of the IPNF Forest Plan standards is to maintain 80 percent emergence in Fisheries Streams, as calculated with this model. The value of the emergence predictions are questionable and may not provide any scientific value.

PERCENT OF POTENTIAL FRY EMERGENCE IN FISHERIES STREAMS

DRAINAGE	A	B2	D	E	EH	H	I	J1	J2	J2H	K
Bussard Creek	100	97	99	100	99	99	99	99	99	98	99
Upper Meadow Creek	79	77	79	79	79	78	78	79	78	78	78
Hellroaring Creek	80	74	79	79	79	78	78	78	78	78	78

United States Department of Agriculture | Forest Service | Idaho Panhandle National Forests | 1201 Ironwood Drive Couer d'Alene, ID 83814

Reply To: 2672

SUBJECT Biological Evaluation for West Moyie Timber Harvest Projects

Date: March 26, 1991

To: District Ranger, Bonners Ferry Ranger Station

BIOLOGICAL EVALUATION FOR WESTSLOPE CUTTHROAT TROUT, RAINBOW TROUT, AND BULL TROUT IN THE WEST MOYIE DECISION AREA

In compliance with Forest Service Manual 2672.41, the following biological evaluation has been conducted for westslope cutthroat trout, redband trout, and bull trout:

1. *SPECIES* Westslope cutthroat trout, _Oncorhynchus clarki lewisi_
   Rainbow trout, _Oncorhynchus mykiss_
   Bull trout, _Salvelinus confluentus_

2. *PROGRAM* Timber Sale

3. *LOCATION* Boundary County, Idaho
   Bonners Ferry Ranger District
   Idaho Panhandle National Forests
   T63, 64, and 65N, R2E, and T64N, R1E, BM
   Portions of Compartment 727, subcompartments 2 & 5; compartments 737 and 735; and portions of compartment 738, subcompartments 2 & 5.

4. *STATUS OF SPECIES AND HABITAT IN PROJECT AREA*

Westslope Cutthroat Trout

The westslope cutthroat trout is listed as sensitive by Region 1 of the United States Forest Service. Rieman and Apperson (1989) concluded that viable populations still exist in only 36% of their original range in Idaho. This species is found throughout the Idaho Panhandle National Forest and is present in all of the streams associated with this proposed action. The fish are sensitive to changes in habitat diversity (Ned Horner IDFG, personnel communication) and competition with non-native brook trout (Mike Enk USFS, personnel communication). Factors limiting the population include over harvest, pool habitat and cover loss, and competition with non-native fish (Rieman and Apperson 1989).

Upper Meadow Creek is listed in the IPNF Forest Plan as containing a population of pure strain westslope cutthroat trout. A 1979 analysis of cutthroat trout from IPNF streams (Wallace 1979) found that the westslope cutthroat trout in Upper Meadow Creek were from 1/3 to 1/2 hybridized. Pure strain cutthroat trout could be present in Upper Hellroaring Creek as well, but was not included in the 1979 analysis.

Throughout the Decision Area, stream gradients vary from 0->8%. Stream channels vary from bedrock to cobble armor. Large Woody debris, important in creating habitat diversity, is principally found in tributary "B" and "C" channels. In the Moyie River itself it is felt that early logging, log drives and stream clearing efforts resulted in significant losses of large woody debris. These channel types are also the most important for fish habitat. Cutthroat trout are thought to use some of the smaller tributaries as spawning sites in the spring. Only three of the streams within or adjacent to the West Moyie Decision Area are considered to have habitat suitable for spawning and rearing, and then only on a limited scale. These streams include: Bussard Creek, Meadow Creek, and Round Prairie Creek (Horner 1985).

Bull Trout

Fluvial bull trout from the Kootenai River may have once used the Moyie River for spawning and rearing, however the construction of a hydroelectric dam at the mouth of the Moyie River has eliminated access. Resident bull trout are not known to occur in the tributaries within the West Moyie Decision Area (Horner, 1985).

Redband Trout

Redband trout are known to exist in the Kootenai River drainage (Doug Perkinson USFS, personnel communication). No known populations have been identified in the Moyie drainage in the United States portion of the watershed.

5. *PROPOSED ACTION*

Alternative K, the selected alternative, would harvest approximately 15.9 MMBF in four timber sales. The timber sales are scheduled for sale in 1993, 1994, and 1995. Major activities associated with these timber sales should be completed by 1998. The selected alternative would leave about 2000 acres in an unroaded condition. Access to treat harvest units would require 6.6 miles of road construction and 8.4 miles of reconstruction. All newly constructed roads will be closed to public access following completion of the timber harvest activities. Closure of roads over 1/2 mile in length will be by gate; closure of other roads will be by barrier. Roads closed with gates will be maintained for future access. Approximately 1 mile of existing road and 1 mile of newly constructed road will be closed with a barrier and seeded.

There would be no clearcutting with this alternative. Even-aged regeneration harvesting would consist of shelterwood systems. After regeneration is established, these stands would be re-entered to remove a portion of the overstory. The final overstory removal would not occur until the stand of regeneration has grown to the point where past management activities are not noticeable (approximately 40 to 60 years , or until the first commercial thinning of the regenerated stand).

A total of 3098 acres would be treated in 63 cutting units. Of these, 140 acres would be seed tree harvested and 273 acres would be shelterwood harvested, for a total of 413 acres of even-aged regeneration harvesting. Forty acres would be harvested using single tree selection uneven-aged regeneration systems. 777 acres would be harvested using group selection form of uneven-aged regeneration system, for an actual harvest area of 78 acres. Sanitation salvage will be implement-

ed between the groups on 181 acres in stands where the group selection system is prescribed. 717 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 491 acres would be commercially thinned to promote growth. The overstory would be harvested on 49 acres. Sanitation salvage harvesting would be implemented on 611 acres to harvest dead, dying and high-risk timber.

6. *CUMULATIVE EFFECTS OF PROJECT*

It is not anticipated that any other major harvest or roading projects will occur in the Decision Area within the next 10 years.

7. *EFFECTS ON SPECIES AND HABITAT*

No direct impacts are expected to any of the sensitive fish or their habitats within the West Moyie Decision Area. Potential indirect effects include increased turbidity and siltation. Most fine sediments will be filtered out and fish habitat in the tributaries will be protected by establishing a minimum 100 foot non-entry buffer strip along all second order and larger streams to maintain existing rearing and overwintering habitat (pools)(Newbold el al 1980). The current limiting factor in the Moyie River is probably a lack of habitat diversity resulting from historic land management activities, and access to spawning tributaries such as Meadow Creek because of the railroad crossing. Given expected future activities this situation is not expected to change under the selected alternative. Provided peak water yields do not exceed recommended levels, channel stability should remain at the current stable condition.

Modification of the railroad crossing to allow fish access from the Moyie River into Upper Meadow Creek is expected to provide several miles of additional spawning habitat.

8. *Consultation with Others and References*

Informal consultations with: Ned Horner, Idaho Department of Fish and Game; Mike Enk, USDA Forest Service, Flathead National Forest; Bill Ruediger, USDA Forest Service, Region 1 Regional Office, Rick Stowerr, USDA Forest Service, Region 1 Regional Office.

Documents:

Horner, N. 1985. Idaho Department of Fish and Game, Moyie River and tributaries Fishery Habitat Survey

Wallace, R.L. 1979. Final Report, Taxonomic Analysis of Cutthroat Trout From Streams of the Idaho Panhandle National Forests, Idaho. Department of Biological Sciences, University of Idaho, Moscow, Idaho.

Rieman, Bruce E. and K. Apperson. 1989. Status and Analysis of Salmonid Fisheries, Westslope Cutthroat Trout and Analysis of Fisheries Information. Idaho Department of Fish and Game. 113PP.

Newbold, J.D., D.C. Erman, and K.B. Roby. 1980 Effects of logging on Macroinvertebrates in Streams With and Without Buffer Strips. Can. J. Fish. Aquat. Sci. 37: 1076-1085.

9. *DETERMINATION OF EFFECT*

This proposed project is not likely to effect the habitat of the westslope cutthroat trout, rainbow trout, or bull trout in the Moyie River or its tributaries. No other threatened, endangered, proposed or sensitive fish species are found in the project area. The analysis and this determination of "not likely to effect" are also documented in the West Moyie Final Environmental Impact Statement.

/s/ D.Cross
WRITTEN BY: P. David Cross
P. David Cross, Forest Fisheries Biologist

4/4/91
DATE

BEST MANAGEMENT PRACTICES

Introduction

Best Management Practices (BMP's) are the primary mechanism to enable the achievement of water quality standards (Environmental Protection Agency 1987). BMP's include, but are not limited to, structural and non-structural controls, operations, and maintenance procedures. BMP's can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation). Usually BMP's are applied as a system of practices rather than a single practice. BMP's are selected on the basis of site specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

The Idaho Panhandle National Forest Plan states that "Soil and Water Conservation Practices" (SWCP) as outlined in the Soil and Water Conservation Practices Handbook (FSH 2509.22, May 1988) will be incorporated into all land use and project plans as a principal mechanism for controlling nonpoint pollution sources, meeting soil and water quality goals, and to protect beneficial uses.

Idaho State Water Quality Standards require the use of BMP's as the controlling mechanism for nonpoint pollution. Use of BMP's is also required in the Memorandum of Understanding between the Forest Service and the State of Idaho as part of our responsibility as the Designated Water Quality Management Agency on National Forest System lands.

The Practices described herein are tiered to the practices in FSH 2509.22. They were developed as part of the NEPA process, with interdisciplinary involvement, and meet State and Forest water quality objectives. The purpose of this appendix document is to establish the connection between the SWCP commonly employed by the Forest Service and BMP's identified in Idaho Water Quality Standards (Id. APA 16.01.2300.05); and to identify how the SWCP, Standard Specifications for the Construction of Roads, and the Timber Sale Contract provisions meet or exceed the Rules and Regulations Pertaining to the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code (BMP's).

BMP Implementation Process

In cooperation with the State, the USDA Forest Service's primary strategy for the control of nonpoint sources is based on the implementation of BMP's determined necessary for the protection of the identified beneficial uses.

The Forest Service Nonpoint Source Management System consists of:

1. BMP selection and design based on site-specific conditions; technical, economic and institutional feasibility; and the designated beneficial uses of the streams.

2. BMP Application

3. BMP monitoring to ensure that they are being implemented and are effective in protecting designated beneficial uses.

4. Evaluation of BMP monitoring results.

5. Feeding back the results into current/future activities and BMP design.

The District Ranger is responsible for insuring that this BMP feedback loop is implemented on all projects.

BMP Selection and Design

Water quality goals and objectives are identified in the IPNF Forest Plan (Forest Plan, page II-1, 2, 7, and 9). These goals and objectives meet or exceed applicable legal requirements, including State water quality regulations, the Clean Water Act, and the National Forest Management Act. Environmental assessments for projects are tiered to Forest Plans, using the NEPA process.

Appropriate BMP's are selected for each project by an interdisciplinary team. Each time BMP's are applied to a new location, flexibility is allowed to design different BMP's depending on the local conditions and values, and the downstream beneficial uses of water.

BMP selection and design are dictated by water quality objectives, soils, topography, geology, vegetation, and climate. Environmental impacts and water quality protection options are evaluated and alternative mixes of practices are considered. A final collection of practices are selected that not only protect water quality but meet other resource needs. These final selected practices constitute the BMP's.

BMP Application

The BMP's are translated into contract clauses, special use permit requirements, project plan specifications, and so forth. This ensures that the operator or person responsible for applying the BMP actually is required to implement it. The site-specific BMP prescriptions are taken from plan-to-ground by a combination of project layout and resource specialists (hydrology, fisheries, soil, geology, etc.). This is when final adjustments to fit the BMP prescriptions to the site are made before implementing the resource activity.

BMP Monitoring

When the resource activity (i.e., timber harvest or road construction) begins, timber sale administrators, engineering representatives, resource specialists, and others ensure that the BMP's are implemented according to plan. BMP implementation monitoring is done before, during, and after resource activity implementation. Once BMP's have been implemented, sample monitoring is done by the Bonners Ferry hydrologist to evaluate if BMP's are effective in meeting management objectives and protecting water beneficial uses.

BMP Monitoring Evaluation

The technical evaluation/monitoring described above will determine how effectively BMP's protect and/or improve water quality. Water quality standards and conditions of the beneficial uses of water will serve as one evaluation criteria. If the evaluation indicates that water quality standards are not being met and/or beneficial uses are not being protected, corrective action will consider the following three components:

The BMP: Is it technically sound? Is it really best, or is there a better practice which is technically sound and feasible to implement?

The Implementation program or processes: Was the BMP applied entirely as designed? Was it only partially implemented? Were personnel, equipment, funds, or training lacking which resulted in inadequate or incomplete implementation?

The State water quality criteria: Do the parameters and criteria that constitute water quality standards adequately reflect human induced changes to water quality and beneficial uses?

Feedback

Feedback of the results of BMP evaluation is both short- and long-term in nature. Where corrective action is needed, immediate response will be undertaken. This action may include: modification of the BMP, modification of the activity, ceasing the activity or possible modification of the State water quality standards. Cumulative effects over the long-term may also lead to the need for possible corrective actions. The District Ranger is responsible for insuring that this BMP feedback loop is implemented on all projects.

KEY SOIL AND WATER CONSERVATION PRACTICES

Class *		Soil and Water Conservation Practice (FSH 2509.22)
	11	**WATERSHED MANAGEMENT**
W	11.05	Wetlands Analysis and Evaluation
W	11.07	Oil and Hazardous Substance Spill Contingency Planning
W	11.09	Management by Closure to Use
	13	**VEGETATION MANIPULATION**
G	13.02	Slope Limitations for Tractor Operation
G	13.03	Tractor Operation Excluded from Wetlands, Bogs, and Wet Meadows
E	13.04	Revegetation of Surface Disturbed Areas
E	13.05	Soil Protection During and After Slash Windrowing
E	13.06	Soil Moisture Limitations for Tractor Operation
	14	**TIMBER**
A	14.02	Timber Harvest Unit Design
A	14.03	Use of Sale Area Maps for Designating Soil and Water Protection Needs
A	14.04	Limiting the Operating Period of Timber Sale Activities
E	14.05	Protection of unstable Areas
A	14.06	Riparian Area Designation
G	14.07	Determining Tractor Loggable Ground
E	14.08	Tractor Skidding Design
E	14.09	Suspended Log Yarding in Timber Harvesting
A	14.10	Log Landing Location and Design
E	14.11	Log Landing Erosion Prevention and Control
E	14.12	Erosion Prevention and Control Measures During Timber Sale Operations
E	14.13	Special Erosion Prevention Measures on Area Disturbed by Harvest Activities
E	14.14	Revegetation of Areas Disturbed by Harvest Activities
E	14.15	Erosion Control on Skid Trails
E	14.16	Meadow Protection During Timber Harvesting
S	14.17	Streamcourse Protection (Implementation and Enforcement)
E	14.18	Erosion Control Structure Maintenance
A	14.19	Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
E	14.20	Slash Treatment in Sensitive Areas
A	14.22	Modification of the Timber Sale Contract

KEY SOIL AND WATER CONSERVATION PRACTICES (continued)

Class *		Soil and Water Conservation Practice (FSH 2509.22)
	15	**ROADS AND TRAILS**
A	15.02	General Guidelines for Road Location/Design
E	15.03	Road and Trail Erosion Control Plan
E	15.04	Timing of Construction Activities
E	15.06	Mitigation of Surface Erosion and Stabilization of Slopes
E	15.07	Control of Permanent Road Drainage
E	15.08	Pioneer Road Construction
E	15.09	Timely Erosion Control Measures on Incomplete Road and Streamcrossing Projects
E	15.10	Control of Road Construction Excavation & Sidecast Material
S	15.11	Servicing and Refueling of Equipment
S	15.12	Control of Construction In Riparian Areas
S	15.13	Controlling In-Channel Excavation
S	15.14	Diversion of Flows Around construction Sites
S	15.15	Streamcrossings on Temporary Roads
S	15.16	Bridge & Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)
E.	15.17	Regulation of Borrow Pits, Gravel Sources and Quarries
E	15.18	Disposal of Right-of-Way and Roadside Debris
S	15.19	Streambank Protection
E	15.21	Maintenance of Roads
E	15.22	Road Surface Treatment to Prevent Loss of Materials
E	15.23	Traffic Control During Wet Periods
G	15.24	Snow Removal Controls
E	15.25	Obliteration of Temporary Roads
E	15.27	Trail Maintenance and Rehabilitation
	18	**FUELS MANAGEMENT**
E	18.02	Formulation of Fire Prescriptions
E	18.03	Protection of Soil and Water from Prescribed Burning Effects

*** CLASSES OF SWCP (BMP)**

A = Administrative
E = Erosion Reduction
S = Stream Channel Protection/Stream Sediment Reduction
G = Ground Disturbance Reduction
W = Water Quality Protection

FORMAT OF THE BMP's

Each Soil and Water Conservation Practice (SWCP) is described as follows:

Title: Includes the sequential number of the SWCP and a brief title

Objective: Describes the SWCP objective(s) and the desired results for protecting water quality.

Effectiveness: Provides a qualitative assessment of expected effectiveness that the applied measure will have on preventing or reducing impacts on water quality. The SWCP effectiveness rating is based on literature & research, administrative studies, and professional experience. The SWCP is rated either High, Moderate, or Low based on the following criteria:

a. Literature/Research (must be applicable to area)
b. Administrative studies (local or within similar ecosystem)
c. Experience (judgment of an expert by education and/or experience)
d. Fact (obvious by reasoned [logical] response)

Compliance: Provides a qualitative assessment of how the implementation of the specific measures will meet the Forest Practice Act Rules and Regulations pertaining to water quality.

Implementation: This section identifies: (1) the range of site-specific water quality protection measures to be implemented and (2) how the practices are expected to be applied and incorporated into the Timber Sale Contract.

ITEMS COMMON TO ALL SOIL AND WATER CONSERVATION PRACTICE

Responsibility for Implementation: The District Ranger (through the presale forester) is responsible for insuring the factors identified in the following SWCPs are incorporated into: Timber Sale Contracts through the inclusion of proper B and/or C provisions; or Public Works Contracts through the inclusion of specific contract clauses.

The Contracting Officer, through his/her official representative (Sale administrator and/or Engineering Representatives for timber sale contracts; and Contracting Officers Representative for public works contracts) is responsible for insuring that the provisions are properly administered on the ground.

Monitoring: Unless otherwise noted, the SWCPs will be monitored by the TSA as part of BMP Implementation Monitoring of timber sale activities, and by the COR on public works road construction work.

ABBREVIATIONS

TSC = Timber Sale Contract	SAM = Sale Area Map
TSA = Timber Sale Administrator	COR = Contracting Officer Representative
PWC = Public Works Contract	FPA = Idaho Forest Practices Act
SCA = Stream Channel Alteration Act	SWCP = Soil and Water Conservation Practices
BMP = Best Management Practice	SMZ = Streamside Management Zone
SPS = Special Project Specification	EPA = Environmental Protection Agency
CFR = Code of Federal Regulations	

PRACTICE 11.05 - *Wetlands Analysis and Evaluation*;
PRACTICE 13.03 - *Tractor Operation Excluded from Wetlands, Bogs, & Wet Meadows*;

OBJECTIVE: To maintain wetland functions and avoid adverse soil and water resource impacts associated with the destruction or modification of wetlands, bogs and wet meadows.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rule 3.h.iii - Exceeds

IMPLEMENTATION: When there are wetlands within the sale area, they must be identified on the SAM. At a minimum, the following specific protective requirements for wetlands identified on the SAM will be incorporated into C6.61 (Wetlands Protection):

1. Unless otherwise agreed, trees felled into wetlands, bogs and wet meadows shall be removed by end-lining, and resulting logging slash shall also be removed. Damage to stream courses, and riparian areas caused by unauthorized Purchaser's operations shall be repaired by the Purchaser in a timely manner to restore and prevent further damage.

2. A Streamside Management Zone (equipment exclusion zone) shall extend a minimum of 50 feet from the wetlands, bogs, and wet meadows.

PRACTICE 11.07 - *Oil and Hazardous Substance Spill Contingency Planning*

OBJECTIVE: To minimize contamination of waters from accidental spills by prior planning and development of Spill Prevention Control and Countermeasure Plans.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rule 2.j.i,ii - Meets

IMPLEMENTATION: TSC provision C6.341 holds the purchaser responsible for taking appropriate preventive measures to insure that any spill of oil or oil products does not enter any stream or other waters of the United States. If the total oil or oil products storage exceeds 1320 gallons or if any single container exceeds a capacity of 660 gallons, the purchaser will prepare a Spill Prevention Control and Countermeasures Plan. The plan shall meet EPA requirements including certification by a registered professional engineer. If necessary, specific requirements for transporting oil to be used in conjunction with the contract will be specified in TSC provision C6.53.

PRACTICE 11.09 - *Management by Closure to Use*

OBJECTIVE: To exclude activities that could result in damages to facilities or degradation of soil and water resources.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rule 4.d.v(c) - Meets

IMPLEMENTATION: Specific guidelines for closure of roads during the period of the contract and at the end of the purchasers operations will be spelled out in the TSC provision C5.51.

> Upon completion and acceptance of logging operations, the purchaser will complete all required erosion control measures and close access roads at location(s) designated by the Forest Service using methods of closure as identified in the timber sale contract.

PRACTICE 13.02 - *Slope Limitations for Tractor Operation*

OBJECTIVE: To reduce gully & sheet erosion and associated sediment production by restricting tractor operation to slopes where corrective measures for proper drainage are easily installed and effective.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rules 3.c.i. & c.ii - Meets

IMPLEMENTATION Tractor or wheel skidding shall not be conducted on geologically unstable, saturated, or easily compacted soils. On slopes exceeding 35 percent gradient, tractor or wheel skidding shall be conducted during the winter with a minimum of 18 inches of snow cover or with a softtrack skidding machine. On slopes exceeding 45 percent gradient and which are immediately adjacent to a class I or II stream, tractor or wheel skidding shall not be conducted unless the operation can be done without causing accelerated erosion. Where slopes in the area to be logged exceed 45 percent gradient, skidding shall be done in the winter with a minimum of 18 inches of snow cover and a softtrack skidding machine shall be used. In addition, the Forest Service shall notify the department of these steep slopes. When tractor skid trails are required on geologically unstable, saturated, or highly erodible or easily compacted soils, the maximum grade of the strail shall be limited to 30 percent.

These factors will be sale design criteria when delineating skidding and yarding methods on the SAM.

PRACTICE 13.03 - *Tractor Operation Excluded from Wetlands, Bogs, & Wet Meadows;*

See Practice 11.05

PRACTICE 13.04 - *Revegetation of Surface Disturbed Areas*

OBJECTIVE: To protect soil productivity and water quality by minimizing soil erosion.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 3.d.ii & e.i, ii - Meets

IMPLEMENTATION: Temporary roads, landings, and skid trails in the West Moyie area will be seeded following use. The seed mixtures will be specified in the TSC. Seed mixes (consisting of native species) and fertilizer specifications will be incorporated into TSC provision C6.601# (Erosion Control Seeding).

TSC provision C6.623# (Temporary Road, Skid Trail/Skid Road and Landing) will identify that scarification/ ripping of compacted landings and closed roads will be a minimum of 6 inches, not to exceed 2 feet.

PRACTICE 13.05 - *Soil Protection During and After Slash Windrowing*
PRACTICE 15.18 - *Disposal of Right-of-Way and Roadside Debris*

OBJECTIVE: To reduce erosion and sedimentation from road surfaces and fill slopes, slash is windrowed below the fill slope.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rule 4.c.iv - Meets

IMPLEMENTATION: Slash windrows will be required by design in most areas. Where slash windrows are not desirable or practical, other methods of erosion control such as erosion matts, mulch, and straw bale or fabric sediment fences will be used. The slash windrows and other erosion control devices will not be placed in existing stream channels or obstruct culvert outfalls.

PRACTICE 13.06 - *Soil Moisture Limitations for Tractor Operation*

OBJECTIVE: To minimize soil compaction, puddling, rutting, and gullying with resultant sediment production and loss of soil productivity.

EFFECTIVENESS: High **COMPLIANCE:** No Related FPA Rule

IMPLEMENTATION: Tractor operations will be limited to periods when the soil moisture content is 18% or less, the ground is frozen, or there is at least 18 inches of snow depth. Tractor operations will only be allowed outside of these specifications through the use of designated skid trails. These requirements will be incorporated into TSC provisions C6.315# and C6.4#.

PRACTICE 14.02 - *Timber Harvest Unit Design*;
PRACTICE 14.08 - *Tractor Skidding Design*;
PRACTICE 14.10 - *Log Landing Location and Design*

OBJECTIVE: To insure that timber harvest unit design will maintain water quality and soil productivity by locating/designing landings and skidding patterns to best fit the terrain and avoid soil erosion.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 3.c.iii; 3.d.i & ii - Meets

IMPLEMENTATION: TSC provision C6.3 (Plan of Operation) will specify how Purchaser intends to meet erosion control requirements.

TSC provision B6.422 (Landings and Skid Trails) requires that the location of all skid trails and landings must be agreed upon before construction. Specific criteria that will be addressed during sale-layout and pre-work with the operator will include:

Skid Trails:

a. Design and locate skid trails and skidding operations to minimize soil disturbance. Skid trail width and number will be kept to a minimum.

b. Locate skid trails to avoid concentrating runoff and provide breaks in grade and waterbars.

c. Locate skid trails and landings away from natural drainage systems and stream protection zones. Divert runoff to stable areas.

Landings

a. Landings and log decks will not be located within Riparian Areas.

b. Landings, log decks, and/or burn piles will be located a minimum of 100 feet from streams, far enough away that direct (unfiltered) entry of sediment, bark, or ash and burning products, will not occur.

PRACTICE 14.03 - *Use of Sale Area Maps for Designating Soil & Water Protection Needs*

OBJECTIVE: To delineate the location of protection areas and special treatment areas, to insure their recognition, proper consideration, and protection on the ground.

EFFECTIVENESS: High **COMPLIANCE:** No related FPA rule

IMPLEMENTATION: The following features will be designated on the SAM:

a. The stream courses (perennial and ephemeral) listed below will be designated as Stream Course Protection areas to be protected under TSC B6.5

1. Hellroaring Creek - The entire mainstem length on National Forest

2. Little Hellroaring Creek - The entire mainstem length on National Forest

3. Bussard Creek - The entire mainstem length on National Forest

4. Rutledge Creek - The entire mainstem length on National Forest

5. Mcdougal Creek - The entire mainstem length on National Forest

6. Wall Creek - The entire mainstem length on National Forest

7. East Fork of Meadow Creek - The entire mainstem length on National Forest

8. Class 1 and 2 tributaries to the above Creeks and the Moyie River that would have timber sale operations within their vicinity.

b. Wetlands (meadows, lakes, pot holes, etc.) to be protected per C6.61.

c. Special treatment areas, including riparian areas with planned harvest where logging and site prep will differ from adjoining the unit as identified in TSC provision C6.50# (Riparian Areas)

These features will be reviewed on the ground by the Purchaser and the Sale Administrator prior to harvesting.

MONITORING: A Watershed Specialist (Forest or District) will insure that the above features have been designated on the Sale Area Map during contract development.

PRACTICE 14.04 - *Limiting the Operating Period of Timber Sale Activities*; PRACTICE 15.04 - *Timing of Construction Activities*

OBJECTIVE: To minimize soil erosion, sedimentation and soil productivity loss by insuring activities, including erosion control work, road maintenance, etc., are done: (1) within the time period specified in the TSC; or (2) when ground conditions are such that erosion and sedimentation can be prevented.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA 4.c.ix - Meets

IMPLEMENTATION: Within the West Moyie Area, the following specifications relating to operating periods have been identified and recommended by the IDT:

TSC provision B6.31 allows operations to occur outside Normal Operating Season subject to requirements in B6.6, B6.65, and C5.23.

G. The following requirements apply to operations outside the Normal Operating Season (see H-1, 2 for specific winter operations):

1. Drain dips will be built into skidtrails and temporary roads at the time of construction, where feasible. Where draindips are not feasible, or are not functioning, trails and temporary roads will be waterbarred and maintained as necessary and/or prior to any prolonged shutdown.

2. Pioneering on specified road construction will be limited to 1,000 feet after October 31.

3. Temporary Roads will be seeded immediately following construction.

4. All surface erosion and stabilization activities will be placed prior to November 1 of each year.

H. The following requirements apply to winter operations:

1. Skid trails will be constructed with waterbars and/or draindips, and allowed to freeze prior to skidding operations.

2. Prior to spring shutdown, slash and/or cull logs will be placed into skidtrails to approximate waterbars.

3. Breaks will be provided in the snow berm during snowplowing activities.

Winter operations will also require the following language in the referenced TSC provisions:

a. All streams and channels within harvest units will be flagged or otherwise identified. (Predesignated under C6.50#).

b. During all snowplowing activities, breaks will be maintained in the snow berm along the outside of roads, particularly in the areas where needed for road drainage (C5.46).

Operations will be discontinued if conditions change and activities are no longer operating on frozen or snow covered ground, the intent of winter logging.

PRACTICE 14.05 - *Protection of Unstable Areas*
PRACTICE 15.05 - *Slope Stabilization and Prevention of Mass Failures*

OBJECTIVE: To protect unstable areas and to avoid triggering mass movements of the soil mantle and resultant erosion and sedimentation.

EFFECTIVENESS: Moderate **COMPLIANCE:** No Related FPA Rule

IMPLEMENTATION: Within the West Moyie Area, naturally unstable areas are identified at all stages of the planning, field evaluation and layout stages.

1. Avoid road locations or timber harvesting on or adjacent to active landslides, slump blocks and other mass wasting processes.

2. If road construction is necessitated in an area of moderate instability, the embankment should be layer placed or as recommended by a geotechnical engineer.

3. Identify any opportunities to stabilize existing unstable areas or minimize the adverse impacts associated with the unstable areas.

PRACTICE 14.06 - *Riparian Area Designation*
PRACTICE 15.12 - *Control of Construction in Riparian Areas*

OBJECTIVE: To minimize the adverse effects on Riparian Areas with prescriptions that manage nearby logging and related land disturbance activities.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 3.g.ii, iii, & iv; 3.f.iv - Exceeds

IMPLEMENTATION: Riparian areas will be identified prior to ground disturbing activities. Riparian areas will be protected through the following requirements that will be incorporated into timber sale layout, or into the timber sale contract as identified below:

1. When cable yarding is necessary, across or inside riparian areas it shall be done in such a manner as to minimize stream bank vegetation and channel disturbance. (C6.4#)

2. Provide the shading, soil stabilization and water filtering effects of vegetation along Class 1 streams by one or more of the following:

(a) Leave hardwood trees, shrubs, grasses, and rocks wherever they afford shade over a stream or maintain the integrity of the soil near a stream.

(b) Where insufficient non-merchantable tree species exist to provide 75 percent of the original shade over the stream, a harvest plan acceptable to the department, of scattered cuttings or other means, shall be developed which will not result in a significant increase in stream temperature or remove a substantial amount of cover necessary for wildlife.

(c) Carefully log the mature timber from the Stream Protection Zone in such a way that shading and filtering effects are not destroyed.

(d) Where it is not feasible to leave trees and shrubs to shade a stream, the variance procedure (Rule 2.a.) shall be followed to reestablish streamside vegetation within one year after cutting, site preparation, or burning.

3. Provide soil stabilization and water filtering effects along Class II streams by leaving undisturbed soils in widths sufficient to prevent washing of sediment into Class 1 streams. In no case shall this width be less that five feet slope distance above the ordinary high water mark on each side of the stream. (C6.6#)

4. Waste resulting from logging operations, such as crankcase oil, filters, grease and oil containers, shall not be placed inside Class 1 or Class 2 Stream Protection Zones. (B6.34)

PRACTICE 14.07 - *Determining Tractor Loggable Ground*

OBJECTIVE: To protect water quality from degradation resulting from soil erosion and subsequent sedimentation that is caused by tractor logging ground disturbance.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rule 3.c.i, ii, iii - Meets

IMPLEMENTATION: The determination of tractor loggable ground is performed by the interdisciplinary team during the transportation planning portion of the Timber Sale Planning Process. The slope limitations identified under Practice 13.02 are considered during this planning process.

The SAM will identify those harvest units suitable for tractor (or wheel) skidding.

PRACTICE 14.08 - *Tractor Skidding Design*

See Practice 14.02

PRACTICE 14.09 - *Suspended Log Yarding in Timber Harvesting*

OBJECTIVE: To protect the soil from excessive disturbance and accelerated erosion and to maintain the integrity of the Riparian Area and other sensitive watershed areas.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rule 3.g.ii - Exceeds

IMPLEMENTATION: Cable yarding (partial or full suspension) will be used on all areas identified for such logging on the sale area map. As noted in TSC provision B1.1, item (n), areas requiring special yarding, as identified in TSC provision B6.42 (Skidding and Yarding), will be identified on the sale area Map. These requirements will be included in TSC C6.4# (Conduct of Logging).

PRACTICE 14.10 - *Log Landing Location and Design*

See Practice 14.02

PRACTICE 14.11 - *Log Landing Erosion Prevention and Control*;
PRACTICE 14.12 - *Erosion Prevention & Control During Timber Sale Operations*;
PRACTICE 14.15 - *Erosion Control on Skid Trails.*

OBJECTIVE: To protect water quality by minimizing erosion and subsequent sedimentation derived from log landings and skid trails.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 3.e.i, ii; 3.d.iii - Meets

IMPLEMENTATION: For each landing, skid trail or fire trail a drainage system shall be provided and maintained that will control the dispersal of surface water in order to prevent sediment from damaging Class 1 streams. The following criteria will be used in controlling erosion and restoring landings and skid trails so as to minimize erosion:

General:

a. TSC provision B6.6 requires the purchaser to conduct operations in a reasonable fashion to minimize erosion. This is a standard provision in the TSC. Additionally, specific erosion requirements will be spelled out in TSC Provisions such as C6.4#, C6.6, C6.601#, C6.602#, C6.622, C6.623#.

b. Skid trails and landings will be seeded with a mix specified in C6.601#.

Landings:

a. During period of use, landings will be maintained in such a manner that debris and sediment are not delivered to any streams.

b. Reshape landings as needed to facilitate drainage prior to fall and spring runoff. Stabilize all landings by establishing ground cover or by some other means within one year after harvesting is completed.

c. Landings will drain in a direction and manner that will minimize erosion and will preclude sediment delivery to any stream.

d. Standard TSC provision B6.63 (Landings) requires that after landings have served the Purchaser's purpose, the Purchaser shall ditch or slope them to permit the water to drain or spread.

e. Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable locations at least 100 feet outside of the appropriate Stream Protection Zone.

Skid Trails:

a. Spacing of water bars on skid trails will be designated by the sale administrator and/or watershed specialist.

b. Stabilize skid trails and fire trails whenever they are subject to erosion, by water barring, cross draining, cutsloping, scarifying, seeding or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff.

PRACTICE 14.13 - *Special Erosion Prevention Measures on Areas Disturbed by Harvest Activities*
PRACTICE 14.14 - *Revegetation of Areas Disturbed by Harvest Activities*

OBJECTIVE: To establish a vegetative cover on disturbed sites in order to reduce erosion and sedimentation on disturbed areas where normal revegetation methods where other contract provisions will not apply.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 3.e.i and 3.d.iii - Meets

IMPLEMENTATION: Revegetation by seeding and fertilization to control erosion is planned for all temporary roads, skid trails, and landings. If erosion problems still occur on these areas, or other problem areas are discovered or are brought to the attention of the Sale Administrator, KV Plans will be revised to reseed and/or fertilize, or provide for other control measures. If KV Funds are not available, Appropriated Funds will be used.

PRACTICE 14.15 - *Erosion Control on Skid Trails*

See Practice 14.11

PRACTICE 14.16 - *Meadow Protection During Timber Harvesting*

OBJECTIVE: To avoid damage to the ground cover, soil and water in meadows.

EFFECTIVENESS: High **COMPLIANCE:** No Related FPA Rule

IMPLEMENTATION: Vehicular or skidding equipment shall not be used on meadows except where roads, landings, and tractor roads are approved. In all cases, soil and vegetation will be protected from disturbance which would cause adverse affects on water quality, quantity and aquatic habitat. The TSC Provision B6.61 (Meadow Protection) is a standard provision in all contracts.

Unless otherwise agreed, trees felled into meadows shall be removed by end-lining, and resulting logging slash shall also be removed. Damage to meadows, stream courses, and riparian areas caused by unauthorized Purchaser's operations shall be repaired by the Purchaser in a timely manner to restore and prevent further damage.

PRACTICE 14.17 - *Stream Channel Protection (Implementation and Enforcement).*
PRACTICE 15.13 - *Controlling In-Channel Excavation*
PRACTICE 15.19 - *Streambank Protection*

OBJECTIVES: To protect stream beds and streamside vegetation, during and after forest practice operations and road construction, by (1) maintaining unobstructed passage of stormflows; (2) reducing sediment and other pollutants from entering streams; and (4) restoring the natural course of any stream as soon as practical if the stream is diverted as a result of timber management activities.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rules 3.f.i, ii; 3.g.i,ii - Meets

IMPLEMENTATION: Protecting stream channels during timber harvesting is accomplished by contract clauses incorporated into the sale contracts. This is normally accomplished by designating particular streams as protected streamcourses, and limiting or restricting timber management operations in streamside zones. There is substantial overlap between timber sale provisions to protect stream channels, and regulations that govern road construction and other practices.

The intent of the regulations and clauses is to protect the integrity of stream channels, and minimize adverse impacts to the channel and downstream resources and beneficial uses. To list all of the regulations that would be implemented to protect and restrict channel alterations, would require a small book. The following items however, highlight some of the principal provisions incorporated into the TSC that will govern channel protection in the West Moyie project.

1. Purchaser shall repair all damage to a streamcourse if the Purchaser is negligent in their operations, including damage to banks and channel, to an acceptable condition as agreed to by the certified Sale Administrator and Purchaser's representative.

2. All project debris shall be removed from streamcourse, in an agreed manner that will cause the least disturbance. (B6.5 Streamcourse Protection). Specifically:

Wherever possible trees shall be felled, bucked, and limbed in such a manner that the tree or any part thereof will fall away from any *Class 1* streams. Continuously remove slash and other debris that enters *Class 1* streams as a result of harvesting operations. Place removed material five feet slope distance above the ordinary high water mark.

Remove slash and other debris that enters *Class 2* streams whenever there is a potential for stream blockage or if the stream has the ability for transporting the debris immediately following skidding and place removed material above the ordinary high water mark or otherwise treat as prescribed by the department. No formal variance is required.

3. Location and method of stream crossings will be designed and agreed to prior to construction.

4. Wheeled or track laying equipment shall not be permitted to operate within 5 feet slope distance of the apparent high water mark of Class II streams and 75 feet of Class I streams. (C6.6 Erosion Prevention and Control).

5. On perennial class 1 and 2 streams dewatering shall be accomplished prior to excavation for culvert installation.

6. Filter cloth, erosion control blankets, plastic, straw bales, and rip-rap can be used to keep live water from contacting new fill during culvert installations.

7. When dewatering of stream crossings is required, a non-erodeable conduit, flex pipe or geotextile fabric will be used. Diversion dams above the crossing shall be hand constructed. Sediment traps shall be constructed below the stream crossing.

8. When ground skidding systems are employed, logs will be end-lined out of streamside and Riparian Areas. Equipment is permitted to enter streamside areas only at locations and times agreed by the certified Sale Administrator and the Purchaser. (C6.316#, Limited Operating Period; C6.4#, Streamside Management Zone and Riparian Area Protection).

9. Material from temporary road and skid trail stream crossings will be removed and streambanks restored to an acceptable condition. (B6.62 Temporary Roads)

10. When cable yarding is necessary, across or inside the riparian areas, logs should be fully suspended when across a stream and immediately above streambanks. Yarding shall be done in such a manner as to minimize stream bank and channel disturbance.(C6.4 Conduct of Logging)

In channel excavation in perennial streams is governed by Forest Service compliance with the State of Idaho Rules and Regulations for Stream Channel Alternations. The Forest Service is obligated to meet or exceed the Idaho Standards.

The intent of the regulations and clauses is to protect the integrity of stream channels, and minimize adverse impacts to the channel and downstream resources and beneficial uses. To list all of the regulations that would be implemented to protect and restrict channel alterations, would require a small book. The following items however, highlight some of the principal provisions incorporated into the TSC that will govern channel protection in the West Moyie project.

1. Construction equipment may cross, operate in, or operate near streamcourses ***only*** where so agreed to and designated by the Forest Service prior to construction (B6.5, B6.422). Crossing of perennial stream channels will be done in compliance with the specifications in the Stream Channel Alteration Act Rules and Regulations and included in the project specifications.

2. If the channel is damaged during construction, it will be restored as nearly as possible to its original configuration without causing additional damage to the channel.

3. Construction of any hydraulic structures in stream channels will be in compliance with the Rules and Regulations pertaining to the Stream Channel Protection Act, Title 42, Chapter 38, Idaho Code).

PRACTICE 14.18 - *Erosion Control Structure Maintenance*

OBJECTIVE: To insure that constructed erosion control structures are stabilized and working effectively.

EFFECTIVENESS: High **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION: TSC provision B6.66 requires that during the period of the contract, the Purchaser shall provide maintenance of soil erosion control structures constructed by the Purchaser until they become stabilized, but not for more than one year after their construction. After 1 year, any erosion control work needed is accomplished through performance bond earmarked for that use. TSC provision C6.6(F) requires the Purchaser to maintain erosion control structures concurrently with his operations under the sale and in any case not later than 15 days after completion of skidding each unit or subdivision.

PRACTICE 14.19 - *Acceptance of Timber Sale Erosion Control Measures Before Sale Closure*

OBJECTIVE: To assure the adequacy of required timber sale erosion control work.

EFFECTIVENESS: High **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION AND RESPONSIBILITY: TSC provision B6.35 requires that upon the Purchaser's written request and assurance that work has been completed the Forest Service shall perform an inspection. One area the Purchaser's might request acceptance for are specific requirements such as logging, slash disposal, erosion control, or snag felling. In evaluating acceptance the following definition will be used by the Forest Service: "Acceptable" erosion control means only minor deviation from established standards, provided no major or lasting impact is caused to soil and water resources. Certified TSAs will not accept as complete erosion control, measures which fail to meet this criteria.

PRACTICE 14.20 - *Slash Treatment in Sensitive Areas*

OBJECTIVE: To protect water quality by protecting sensitive tributary areas from degradation which would result from using mechanized equipment for slash disposal.

EFFECTIVENESS: Moderate **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION: All such sensitive areas, including riparian harvest areas, bogs and meadows will be identified on the sale area map, the slash treatment map, and in the contract. TSC Provision C6.7 will include the following:

(a) Dozer fire lines will not be constructed on sensitive landtypes on greater than 30 percent slopes

(b) Jackpot burning within Streamside Management Zones will be utilized rather than broadcast burning on slopes greater than 35 percent.

(c) Grapple piling of slash will be used all machine pile units.

PRACTICE 14.22 - *Modification of the Timber Sale Contract*

OBJECTIVE: To modify the Timber Sale Contract if new circumstances or conditions indicate that the timber sale will cause irreversible damage to soil, water, or watershed values.

EFFECTIVENESS: High **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION: Over time, the Forest Service adopts new policies and direction that amend how we address timber harvest operations. An example is the recent change in direction to leave some large organic debris in stream channels instead of removing it all. In cases such as this, modifications to the TSC would occur under provisions B2.37 or B8.32.

If evidence indicates that unacceptable impacts would occur to soil and water resources if the sale was harvested as planned, the Forest Service Representative will request the Contracting Officer to gain Regional Forester advice and approval to proceed with a resource environmental modification, mutual cancellation, or unilateral cancellation of the Timber Sale Contract as allowed by TSC Provisions B8.3 or B8.33. If the decision is for a resource environmental modification, once the action is approved by the Regional Forester, the appropriate Line Officer will assign an interdisciplinary team to make recommendations of implementation.

PRACTICE 15.02 - *General Guidelines for the Location and Design of Roads and Trails*

OBJECTIVE: To locate and design roads and trails with minimal soil and water resource impact while considering all design criteria.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 4.b.i,ii,iii & 4.c.i - Exceeds

IMPLEMENTATION: As the TSC is assembled, road location and design criteria are assembled from several volumes of standard, and optional specifications and guidelines. Specific roads and road segments often have specifications that are unique to the road or road segment. The following listed items, however, and and numerous measures that are incorporated under other Soil and Water Conservation Practices are general road location and design guidelines for minimizing impacts on water quality:

1. Fit the road to the topography - Use natural benches, follow contours, avoid long, steep road grades. Balance cut/fill where possible to avoid waste areas.

2. Locate on stable topography - Avoid slumps and slide-prone areas, and steep sidehills.

3. Location with respect to streams and water bodies, including wetlands - Locate roads a safe distance away from streams and other water bodies, and provide an adequate buffer zone to trap sediment before it enters into any water body. Where possible, locate turn-outs and turn-arounds at least 200 feet from water bodies or riparian zones. Where placement within 200 feet is necessary due to safety considerations, emphasize erosion control measures to protect water quality; i.e additional windrowing, seeding, etc.

4. Stream crossing sites - Minimize the number of stream crossings, and choose stable sites. Major culverts will be sized, based on hydrologic analysis, to function effectively at 50 year peak flows, without water backing up. These culverts will be tested to withstand 100 year peak flows without failing. All other live streams will be sized, based on hydrologic analysis, for 20 year peak flows with maximum headwater depth ratios of 1.2, and withstand 50 year peak flows without failing.

5. Road drainage - Locate and design roads and trails to drain naturally by appropriate use of out-sloping, rolling dips, and grade changes, where possible. Cross drains will be installed in ditched areas to 1) carry intercepted flow across constructed areas; 2) to relieve the length of undrained ditch; and 3) to reduce disruption of normal drainage patterns. Road and trail drainage should be channeled to effective buffer areas, either natural or manmade, to maximize sediment deposition prior to entry into live water.

6. In addition, roads and trails will be designed to minimize impacts on water quality. Design criteria to accomplish this will include:

a. Ditch lines and road grades will be designed to minimize unfiltered flow into streams. A rolling dip, relief culvert or similar structure will be installed as close as practical to crossings to minimize direct sediment and/or water input directly into streams. Route the drainage through SMZ, buffer strips, or other sediment settling structures where possible.

b. Slash windrows or other erosion control devices will be used on fill slopes where there is a possibility of erosion or sedimentation into a nearby stream or channel.

7. Design standards- Design to the minimum standard necessary to accomplish anticipated use and equipment needs safely, balancing long-term and short-term maintenance needs.

8. Stabilization of erodable cut and fill surfaces through revegetation- Aggressive seeding and fertilization of erodible surfaces exposed during construction will be accomplished. Next season seeding will be done where original treatment is not fully successful.

PRACTICE 15.03 - *Road and Trail Erosion Control Plan*

OBJECTIVE: To prevent, limit, and mitigate erosion, sedimentation, and resulting water quality degradation prior to the initiation of construction and maintenance activities through effective contract administration during construction and timely implementation of erosion control practices.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 4.b.v & c.iii, iv, &v iii - Meets

IMPLEMENTATION: The following erosion control objectives and mitigation measures have been developed by the IDT and will be reflected in contract specifications and provisions. The Engineer will certify that the Contractors Erosion Control Plan meets the specifications of Std. FS Spec. Section 204:

a. Measures to reestablish vegetation will be accomplished by November 1 on exposed cut and fill slopes. Various operating seasons on varied units and sales within the FEIS Area will require seeding and fertilization specs to vary. Mulching will be required on erodible slopes where difficulty in re-establishing vegetation is anticipated.

b. Prompt attention to potential erosion problems, both anticipated and un-anticipated, before they become a water quality issue, will be required. On-site stock piling of straw bales for immediate availability and erosion cloth or a suitable substitute stored off-site but available will also be required.

c. Slash windrows or other sediment trapping measures will be used on all significant fill slopes where there is a possibility of erosion or sedimentation into a nearby stream or channel (Std. FS Spec. 201).

d. Cross drains and relief culverts will be installed so as to minimize concentrations of intercepted water (see also Practice 15.02 f.(3)).

e. Equipment shall not be operated when ground conditions are such that excessive ground impacts will occur unless these impacts are documented and mitigated through other Conservation Practices.

Prior to the start of construction, the Contractor shall submit a schedule for proposed erosion control work as required in the Standard Specifications. The schedule shall include all erosion control items identified in the specifications. Erosion control work to be done by the Contractor will be defined in Standard Specification 204 and/or in the Drawings. The schedule shall consider erosion control work necessary for all phases of the project. The Contractor's construction schedule and plan of operation will be reviewed in conjunction with the erosion control plan by the TSA, district watershed specialist, and engineering to insure their compatibility before any schedules are approved.

PRACTICE 15.04 - *Timing of Construction Activities*

See Practice 14.04

PRACTICE 15.05 - *Slope Stabilization and Prevention of Mass Failures*

See Practice 14.05

PRACTICE 15.06 - *Mitigation of Surface Erosion and Stabilization of Slopes:*

OBJECTIVE: To minimize soil erosion from road cutslopes, fillslopes, and travelway.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rule 4.c.iii & d.ii - Meets

IMPLEMENTATION: Areas requiring mitigation of surface erosion will occur during the life of the timber sale contract. When these are found, the following provisions will be implemented.

a. All disturbed areas associated with road construction and reconstruction will be seeded. The first seeding will be applied as soon as practical after cuts and fills are brought to grade within seeding seasons as established in specification 625. A second seeding in the fall or spring season following road construction will be required where original seeding did not adequately revegetate exposed soil area.

b. Where surface erosion is occurring because of inadequate vegetative cover, additional seeding and re-fertilization will occur using recommended seed and fertilizer mixes. A T108 specification covers re-seeding of cut slopes if bared by the purchaser's maintenance operation. If the purchaser has done his required seeding, or bare spots are not caused by the purchaser, revise the KV Plan to cover costs.

c. Where ditches are carrying erosion products into stream channels, straw bale and erosion cloth ditch blocks will be installed to "short-circuit" the delivery. Seeding of the eroding surfaces, and seeding of the stored sediment in the ditch will also be accomplished. If problem areas are known before contract award, add C6.602# to require cross ditching on segments of road.

d. Where either straw bale/erosion cloth structures are not felt to be effective, underdrains or other measures will be installed to drain the ditches onto suitable ground, or at least reduce erosion impacts to the stream. If problem areas are known before contract award, add C6.602# to require cross ditching on segments of road.

e. Slumping of cutslopes will require a combination of both mechanical and vegetative controls. If/when this problem is found, a solution will be determined in consultation with Engineers and resource specialists and appropriate actions taken to remedy the situation or minimize adverse impacts.

f. Additional underdrains and/or french drains will be constructed where intercepted moisture is encountered on incised stream approaches. Erosion control blankets and straw bales will be used to dissipate ditch scour and stabilize fill slopes.

PRACTICE 15.07 - *Control of Permanent Road Drainage*

OBJECTIVE: To minimize the erosive effects of concentrated water and the degradation of water quality by proper design and construction of road drainage systems and drainage control structures.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 4.c.viii; 4.d.iii(a) & (b) - Meets

IMPLEMENTATION: The following items will be included in the timber sale contract provisions or road contract special project specifications.

1. During and following operations on out-sloped roads, retain out-slope drainage and remove berms on the outside edge except those intentionally constructed for protection of road grade fills.

2. Construct cross drains and relief culverts to minimize erosion of embankments. Minimize the time between construction and installation of erosion control devices. Use riprap, vegetative matter, downspouts and similar devices to minimize erosion of the fill. (Std Spec 204)

3. Install drainage structures or cross drain uncompleted roads which are subject to erosion prior to fall or spring runoff. (Std Spec 204)

4. Install relief culverts with a minimum grade of 1 percent.

PRACTICE 15.08 - *Pioneer Road Construction*

OBJECTIVE: To minimize sediment production and mass wasting associated with pioneer road construction.

EFFECTIVENESS: Moderate **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION: The following contract specifications will be required:

1. Construction of pioneer roads shall be confined to the designed location of the road prism unless otherwise approved by the Contracting Officer (Std. FS Spec. 203.11).

2. Pioneering shall be conducted so as to prevent undercutting of the designated final cut slope, and to prevent avoidable deposition of materials outside the designated roadway limits (Std. FS Spec. 203).

3. Permanent culverts will be installed at wet crossings during the pioneer phase unless positive control of sediment can be accomplished during installation, use, and removal of the temporary structure.

PRACTICE 15.09 - *Timely Erosion Control Measures on Incomplete Road and Stream-crossing Projects*

OBJECTIVE: To minimize erosion of and sedimentation from disturbed ground on incomplete projects.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 4.c.11,iii,iv; & 4.d.iii - Meets

IMPLEMENTATION: The following measures will be implemented during projects:

1. Temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipators, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion will be installed as necessary. The removal of temporary culverts, culvert plugs, diversion dams, or elevated streamcrossing causeways will be completed as soon as practical;

2. The removal of debris, obstructions, and spoil material from channels and floodplains;

3. Seeding with native species to minimize erosion.

Erosion control measures must be kept current with ground disturbance, to the extent that the affected area can be rapidly "closed," if weather conditions deteriorate. Areas must not be abandoned for the winter with remedial measures incomplete.

PRACTICE 15.10 - *Control of Road Construction Excavation and Sidecast Material*
PRACTICE 15.18 - *Disposal of Right-of-Way and Roadside Debris*

OBJECTIVE: To reduce sedimentation from unconsolidated excavated and sidecast material and construction slash caused by road construction, reconstruction, or maintenance.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rules 4.c.iii, iv; & 4.d.i - Meets

IMPLEMENTATION: In the construction of road fills near streams, compact the material to reduce the entry of water, minimize the amount of snow, ice, or frozen soil buried in the embankment. No significant amount of woody material shall be incorporated into fills. Slash and debris may be windrowed along the toe of the fill, but in such a manner as to avoid entry into a stream and culvert blockage.

Where exposed material (excavation, embankment, borrow pits, waste piles, etc.) is potentially erodible, and where sediments would enter streams, the material will be stabilized prior to fall or spring runoff by seeding, compacting, rip-rapping, benching, mulching or other suitable means.

The following standard specs will be included in all road contracts which include clearing and excavation.

1. Standard Specification 201 (Slash Treatment)
2. Standard Specification 203 (Excavation and Embankments)

PRACTICE 15.11 - *Servicing and Refueling of Equipment*

OBJECTIVE: To prevent contamination of waters from accidental spills of fuels, lubricants, bitumens, raw sewage, wash water, and other harmful materials.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rule 2.j.i & ii - Meets

IMPLEMENTATION: The Contracting Officer Representative will designate the location, size and allowable uses of service and refueling areas. The criteria below will be followed at a minimum:

Petroleum product storage containers with capacities of more than 200 gallons, stationary or mobile, will be located no closer than 100 feet from stream, water course, or area of open water. Dikes, berms, or embankments will be constructed to contain the volume of petroleum products stored within the tanks. Diked areas will be sufficiently impervious and of adequate capacity to contain spilled petroleum products.

i. Transferring petroleum products: During fueling operations or petroleum product transfer to other containers, there shall be a person attending such operations at all times.

ii. Equipment used for transportation or storage of petroleum products shall be maintained in a leakproof condition. If the Forest Service Representative determines there is evidence of petroleum product leakage or spillage he/she shall have the authority to suspend the further use of such equipment until the deficiency has been corrected.

iii. For longer term storage, a sump pond lined with plastic will be constructed equal to the volume of fuel stored on the site.

In the event any leakage or spillage enters any stream, water course or area of open water, the operator will immediately notify the COR who will be required to follow the actions to be taken in case of hazardous spill, as outlined in the Forest Hazardous Substance Spill Contingency Plan (TSC Provision C6.341).

PRACTICE 15.12 - *Control of Construction in Riparian Areas*

See Practice 14.06

PRACTICE 15.13 - *Controlling In-Channel Excavation*

See Practice 14.17

PRACTICE 15.14 - *Diversion of Flows Around Construction Sites*

OBJECTIVE: To minimize downstream sedimentation by insuring that all stream diversions are carefully planned.

EFFECTIVENESS: High

COMPLIANCE: Idaho Rules and Regulations for Stream Channel Alterations - Meets

See also Practice 15.13.

IMPLEMENTATION: Flow in streamcourses may only be diverted if the Forest Service deems it necessary for the contractor to do the job. Such a diverted flow shall be restored to the natural streamcourse as soon as practicable and, in any event, within the period stated in Stream Channel Alteration Act Rules and Regulations. Stream channels impacted by construction activity will be restored to their natural grade, condition, and alignment. (Std. FS Spec. 206, 206A, and applicable SPS's).

PRACTICE 15.15 - *Stream Crossings on Temporary Roads*

OBJECTIVE: To keep temporary roads from unduly damaging streams, disturbing channels, or obstructing fish passage.

EFFECTIVENESS: Moderate

COMPLIANCE: Idaho Rules and Regulations for Stream Channel Alterations - Meets

See also Practice 15.13.

IMPLEMENTATION: Culverts, temporary bridges, low-water crossings, or log-fords will be required on all temporary roads and crossings. Streams that will have flowing water during the life of the temporary crossing will normally use culverts or a bridge. The number of temporary crossings will kept to the minimum needed for access.

a. Temporary crossings on temporary roads will be removed when no longer needed, and any fills will be removed and the channel restored to pre-project condition (TSC B6.62, C6.62#).

b. Temporary crossings on system roads will be removed following use but protected fills, including constructed abutments, may remain.

c. Temporary crossings on temporary roads will only be allowed where anticipated or calculated flow is 40 CFS or less (approx. 48" CMP). Flow situations greater than this will normally not allow temporary crossings. Larger temporary crossing structures may be allowed following IDT review.

PRACTICE 15.16 - *Bridge and Culvert Installation (Disposition of Surplus Material and Protection of Fisheries)*

See also Practice 15.13.

OBJECTIVE: To minimize sedimentation and turbidity resulting from excavation for in-channel structures.

EFFECTIVENESS: High

COMPLIANCE: Idaho Rules and Regulations for Stream Channel Alterations - Meets

IMPLEMENTATION: The following preventive measures will be included in contract specifications for such installations:

a. Diverting stream flow through or around project sites if needed during construction in order to minimize erosion and downstream sedimentation. Active streams will be de-watered or diverted during culvert installations.

b. Erodible material shall not be deposited into live streams.

c. Any material stockpiled on floodplains shall be removed before rising waters reach the stockpiled material.

d. During excavation in or near the streamcourse, it may be necessary to use suitable coffer dams, caissions, cribs or sheet piling. This will usually be the case where groundwater is contributing a significant amount of water to the immediate excavation area. If any of the aforementioned devices are used, they will be practically watertight and no excavation will be made immediately outside of them.

e. Water pumped from foundation excavation shall not be discharged directly into live streams, but shall be pumped into settling ponds or into locations where water will not re-enter water.

PRACTICE 15.17 - *Regulation of Borrow Pits, Gravel Sources and Quarries*

OBJECTIVE: To minimize sediment production from borrow pits, gravel sources, and quarries, and limit channel disturbances in those gravel sources suitable for development in floodplains.

EFFECTIVENESS: High **COMPLIANCE:** No Related FPA Rule

IMPLEMENTATION: Minimize opportunities for erosion from Borrow pits and gravel sources from entering streams.

1. Complete any crushing and/or screening of excavated bedload away from any active stream channels and minimize future opportunities for waste materials to enter area streams, even under flood conditions.

2. Identify opportunities to minimize erosion from existing borrow pits within the drainage.

3. If development of new rock sources are needed within the watershed, complete a pit development plan or rock source development plan which outlines all mitigation measures needed to control future erosion at the rock source.

PRACTICE 15.18 - *Disposal of Right-of-Way and Roadside Debris*

OBJECTIVE: To insure that debris generated during road construction is kept out of streams and to prevent slash and debris from subsequently obstructing channels.

See also Practices 13.05 and 15.10.

EFFECTIVENESS: High **COMPLIANCE:** FPA Rules 4.c.iii, iv; & 4.d.i -

IMPLEMENTATION: See Conservation Practice 13.05 (Soil Protection During and after Slash Windrowing) and 15.10 (Control of Road Construction Excavation & Sidecast Material) for additional measures.

On site disposal of Right-of-Way and roadside debris may be accomplished by one or more of the following practices:

1. Windrowing (SWCP 13.05)
2. Scattering
3. Chipping
4. Disposal in Cutting Units
5. Piling and Burning
6. Removal to previously agreed to locations.

Large limbs and cull logs may be bucked into manageable lengths and piled alongside the road for fuelwood.

PRACTICE 15.19 - *Streambank Protection*

OBJECTIVE: To minimize sediment production from streambanks and structural abutments in natural waterways.

See also Practices 14.06 and 14.17.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rules 3.f.i,ii; 3.g.i,ii - Meets

IMPLEMENTATION: To reduce sediment and channel bank degradation at sites distúrbed by construction of stream crossing or roadway fill, it may be necessary to incorporate "armoring" in the design of a structure to allow the water course to stabilize after construction. Riprap, gabion structures, and other measures are commonly used to armor stream banks and drainage ways from the erosive forces of flowing water. These measures must be sized and installed in such a way that they effectively resist erosive water velocities. Stone used for riprap should be free from weakly structured rock, soil, organic material and materials of insufficient size, all of which are not resistant to stream flow and would only serve as sediment sources. Outlets for drainage facilities in erodible soils commonly require rip-rapping for energy dissipation (FSH 7709.56B, and Std. FS Spec. 619). See Conservation practice 14.17 for additional measures.

PRACTICE 15.21 - *Maintenance of Roads*

OBJECTIVE: To conduct regular preventive maintenance operations to avoid deterioration of the roadway surface and minimize disturbance and damage to water quality, and fish habitat.

EFFECTIVENESS: Moderate **COMPLIANCE:** FPA Rule 4.d -i, ii, iii, iv, v - Meets

IMPLEMENTATION: For roads *in active timber sale areas* standard TSC provision B5.4 (Road Maintenance) requires the purchaser to perform or pay for road maintenance work commensurate with the purchasers use. Purchaser's maintenance responsibility shall cover the before, during, and after operation period during any year when operations and road use are performed under the terms of the timber sale contract (C5.4 - Road Maintenance). Purchaser shall perform road maintenance work, commensurate with purchaser's use, on roads controlled by Forest Service and used by purchaser in connection with this sale except for those roads and/or maintenance activities which are identified for required deposits in C5.411# and C5.412#. All maintenance work shall be done concurrently, as necessary, in accordance with T-specifications set forth herein or attached hereto, except for agreed adjustments (TSC C5.4- T301, 310).

1. Repair and stabilize slumps, slides, and other erosion features causing stream sedimentation.

2. *Active Roads*. An active road is a forest road being used for hauling forest products, rock and other road-building materials. The following maintenance shall be conducted on such roads.

   (a) Culverts and ditches shall be kept functional.

   (b) During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or water barred, and berms removed from the outside edge except those intentionally constructed for protection of fills.

   (c) The road surface shall be maintained as necessary to minimize erosion of the subgrade and to provide proper drainage.

   (d) If road oil or other surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams.

3. *Inactive roads.* An inactive road is a forest road no longer used for commercial hauling but maintained for access (e.g., for fire control, forest management activities, recreational use, and occasional or incidental use for minor forest products harvesting). The following maintenance shall be conducted on inactive roads.

(a) Following termination of active use, ditches and culverts shall be cleared and the road surface shall be crowned, out-sloped or in-sloped, water barred or otherwise left in a condition to minimize erosion. Drainage structures will be maintained thereafter as needed.

(b) The roads may be permanently or seasonally blocked to vehicular traffic.

4. *Abandoned Roads.* An abandoned road is not intended to be used again. No subsequent maintenance of an abandoned road is required after the following procedures are completed:

(a) The road is left in a condition suitable to control erosion by out-sloping, water barring, seeding, or other suitable methods.

(b) Ditches are cleaned.

(c) The road is blocked to vehicular traffic.

(d) The department may require the removal of bridges and culverts except where the owner elects to maintain the drainage structures as needed.

2. For roads *not in an active timber sale area* road maintenance must still occur at sufficient frequency to protect the investment in the road as well prevent deterioration of the drainage structure function. This will be accomplished by scheduling periodic inspection and maintenance, including cleaning dips and cross drains, repairing ditches, marking culvert inlets to aid in location, and cleaning debris from ditches and culvert inlets to provide full function during peak runoff events (FSH 7709.15).

PRACTICE 15.22 - *Road Surface Treatment to Prevent Loss of Materials*

OBJECTIVE: To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production.

EFFECTIVENESS: High **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION: On timber sale roads, the Purchaser shall undertake measures to prevent excessive loss of road material if the need for such action has been identified. Road surface treatments may include: watering, applying magnesium chloride, sealing, aggregate surfacing, chip-sealing, or paving.

PRACTICE 15.23 - *Traffic Control During Wet Periods*

OBJECTIVE: To reduce the potential for road surface disturbance during wet weather and to reduce sedimentation probability.

EFFECTIVENESS: Moderate **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION: Road closures (SWCP 11.09) and traffic control measures should be implemented on all roads when damage would occur as a result of use during wet weather. Roads that must be used during wet periods should have a stable surface and sufficient drainage to allow such use with a minimum of resource impact. Rocking, paving and armoring are measures that may be necessary to protect the road surface and reduce erosion potential. Roads not constructed for all weather use should be closed during the wet season. Where winter field operations are planned, roads may need to be upgraded and maintenance intensified to handle the traffic without creating excessive erosion and damage to the road surfaces.

PRACTICE 15.24 - *Snow Removal Controls*

OBJECTIVE: To minimize the impact of snow melt on road surfaces and embankments and to reduce the probability of sediment production resulting from snow removal operations.

EFFECTIVENESS: Moderate **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION: For Forest roads that will be used throughout the winter, the following measures will be employed:

1. The Purchaser is responsible for snow removal in a manner which will protect roads and adjacent resources.

2. Rocking or other special surfacing and/or drainage measures may be necessary, before the operator is allowed to use the roads.

3. During snow removal operations, banks shall not be undercut nor shall gravel or other selected surfacing material be bladed off the roadway surface. Ditches and culverts shall be kept functional during and following roadway use. If the roadsurface is damaged, the Purchaser shall replace lost surface material with similar quality material and repair structures damaged in blading operations.

4. Snow berms shall not be left on the road surface or shall be placed to avoid channelization or concentration of melt water on the road or erosive slopes. Berms left on the shoulder of the road shall be removed and/or drainage holes opened at the end of winter operations and before the spring breakup. Drainage holes shall be spaced as required to obtain satisfactory surface drainage without discharge on erodeable fills. On insloped roads, drainage holes shall also be provided on the ditch side, but care taken to insure that culverts and culvert inlets are not damaged.

PRACTICE 15.25 - *Obliteration of Temporary Roads*

OBJECTIVE: To reduce sediment generated from temporary roads by obliterating them at the completion of their intended use.

EFFECTIVENESS: High **COMPLIANCE**: FPA Rule 4.d.v. - Meets

IMPLEMENTATION: Effective obliteration is generally achieved through a combination of the following measures: (TSC B6.62, C6.62#, C6.622, C6.623#)

1. Road effectively drained and blocked.

2. Temporary culverts and bridges removed and any modified channel slopes stabilized and revegetated.

3. Road returned to resource production through revegetation (native species, or trees).

4. Sideslopes reshaped and stabilized.

PRACTICE 15.27 - *Trail Maintenance and Rehabilitation*

OBJECTIVE: To minimize soil erosion and water quality problems resulting from trail erosion.

EFFECTIVENESS: High **COMPLIANCE:** No directly related FPA Rule

IMPLEMENTATION: Trail construction and reconstruction projects on the Sidehill trail will include measures to minimize erosion from the trail. These will include:

a. Seeding of wet stream areas and erosion prone areas adjacent to the trail.

b. Corduroy log placement at trail crossings of minor streams.

c. Installing erosion control devised on trails during construction and reconstruction.

PRACTICE 18.02 - *Formulation of Fire Prescriptions*

OBJECTIVE: To provide for soil and water resource protection while achieving the management objective through the use of prescribed fire.

EFFECTIVENESS: High **COMPLIANCE:** No Related FPA Rule

IMPLEMENTATION: The prescription elements are defined by the interdisciplinary team during the environmental analysis. Field investigations are conducted to identify site specific conditions which may affect the prescription. Both the optimum and tolerable limits for soil and water resource needs should be established. Prescription elements will include such factors as fire weather, slope aspect, soil moisture and fuel moisture which influence the fire intensity. These elements have a direct effect on whether or not a litter layer remains after burning and whether or not a water repellent layer is formed. The amount of remaining litter significantly affects erosion rates, water quality and runoff volumes.

PRACTICE 18.03 - *Protection of Soil and Water from Prescribed Burning*

OBJECTIVE: To maintain soil productivity, minimize erosion, and prevent ash, sediment, nutrients, and debris form entering surface water.

EFFECTIVENESS: High **COMPLIANCE:** No Related FPA Rule

IMPLEMENTATION: Forest Service and/or other crews are used to prepare the units for burning. This includes water barring firelines and reducing fuel concentrations. The interdisciplinary team identifies Riparian Areas and soils with water repellant tendencies as part of the environmental analysis. Some of the techniques used to prevent soil erosion and water quality degradation are: (1) construct water bars in fire lines; (2) reduce fuel loadings in drainage channels; (3) maintain the integrity of the Riparian Area; (4) avoid intense fires, which may promote water repellency, nutrient leaching, and erosion; (5) retain or plan for sufficient ground cover to prevent erosion of the burned sites and (6) removal of all debris added to stream channels as a result of prescribed burning, unless debris is prescribed to improve fisheries habitat.

State of Idaho
DEPARTMENT OF HEALTH AND WELFARE
Division of Environmental Quality

2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 667-3524

CECIL D. ANDRUS
Governor
RICHARD P. DONOVAN
Director

March 8, 1990

MEMORANDUM

RECD BFRD
MAR 14 1990

TO: Gary Kappesser

FROM: Jack Skille, Water Quality Compliance Officer JS

RE: **West Moyie EIS**

On March 8, 1990 Steve Tanner and I met with you and Mary Water to discuss the water quality aspects of the West Moyie EIS.

Steve Tanner regulates the public water supplies in Boundary County including the Beeline Water Association. Our concern in the Division of Environmental Quality is with protection of beneficial uses, one of which is public water supplies.

We agree with your approach of using Beeline Water District turbidity records and sediment observations for establishing turbidity thresholds for Meadow Creek. It seems like the logical approach when used in conjunction with the R1-R4 model. It allows for adjusting the alternatives to stay under the thresholds by including mitigations at road crossings, unstable areas, etc. It also shows your concern for protecting water quality in Meadow Creek.

Thank you for including us in these early stages for formulating alternatives in the EIS.

JS:mb

cc: Ed Tulloch, Water Quality Field Supervisor, IDHW-DEQ, CDA
Stephen A. Tanner, Senior Water Quality Specialist, IDHW-DEQ, CDA

APPENDIX D

THREATENED AND ENDANGERED SPECIES

BALD EAGLE
(*Haliaeetus leucocephalus*)

USFWS Status: Endangered
USFS Region 1 Status: Endangered

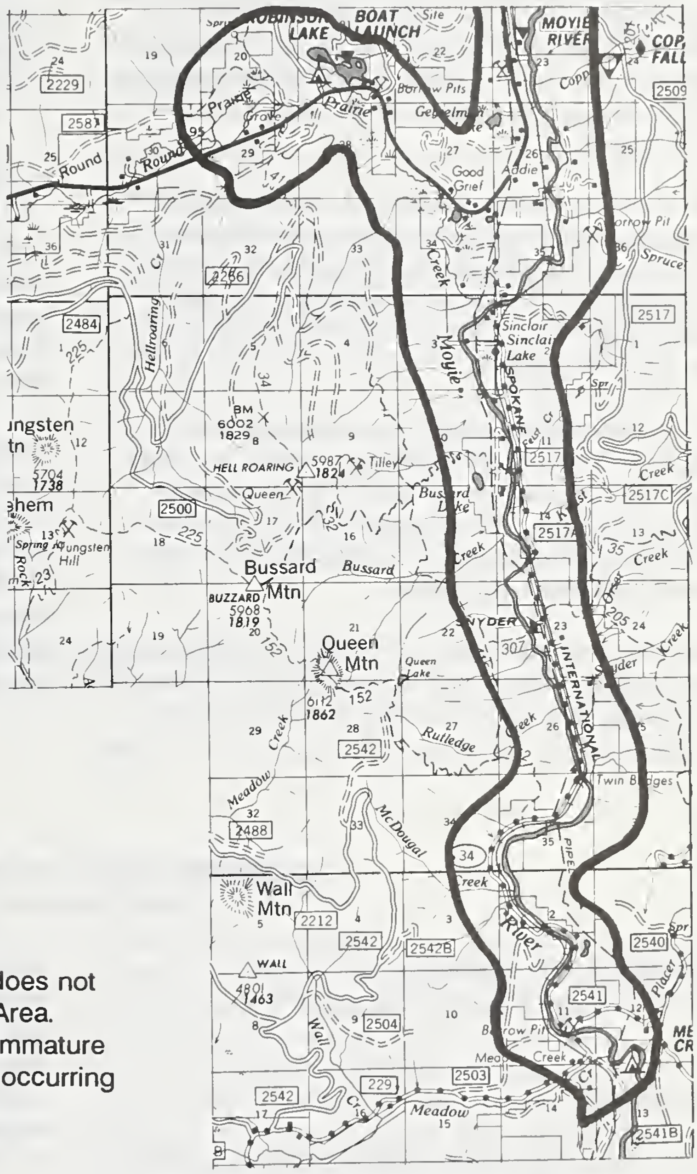
Presence

Four out of the five existing nests in Boundary County are near the Kootenai River. This river provides a more abundant food supply than what occurs in the analysis area. The resident population appears to be slowly increasing. As the resident population of eagles increases, the potential for young resident eagles to colonize the north end of the area may increase.

The Moyie River valley serves as a travel corridor for eagles during migration. This corridor is of less importance than larger regional landscape features such as the Kootenai River and associated Purcell Trench. Eagles dispersing from winter concentrations on Lake Koocanusa and Pend Oreille Lake may exploit winter and road-killed deer in the Moyie valley.

Existing Situation

The U. S. Fish and Wildlife Service (USFWS) does not list the bald eagle as present in the Decision Area. However, there are reports of both adult and immature bald eagles near the vicinity of Robinson Lake occurring throughout the year.



BALD EAGLE ANALYSIS AREA

The Robinson Lake, Round Prairie Creek, and associated wetlands complex has the highest potential for future eagle nesting. This area provides the largest prey base in the Decision Area. Large ponderosa pines occur throughout the area. These trees provide potential nesting sites. The combination of a relatively large prey base and presence of potential nest trees make the north end of the Decision Area a more likely candidate for future nesting than the rest of the Moyie Valley.

Analysis Methods

The area analyzed for bald eagle habitat includes lands within 1/2 mile of Robinson Lake, Round Prairie Creek, and associated wetlands near the north portion of the Decision Area; and the portion of the Moyie River valley, on the east side of the Decision Area.

There are no known bald eagle nests, winter roosts, or traditional feeding sites in the area. This has been determined through informal field surveys, discussions with residents who are interested in wildlife, and with wildlife biologists familiar with eagles.

Potential nesting habitat is considered to be mature to old growth stands or stands with large veteran trees within 1/2 mile of Round Prairie Creek, the Moyie River and Robinson Lake. No harvest activity is proposed in any timber stands that meet these standards.

There are some stands of immature sawtimber located near the Moyie River that will be harvested. These stands will have snag recruitment trees designated according to snag management guidelines. Maturation of these recruitment trees will provide for future nest sites in these stands. A buffer zone will be left between these stands and the Moyie River which will provide for future perch trees along the rivers edge.

Consistency with the Forest Plan

The Forest Plan's direction on bald eagle management is to emphasize surveys and mapping of nesting, feeding and roost sites and protection of these identified use areas (Forest Plan, p. II-6).

New nesting sites, if they occur, will be managed in accordance to the Pacific States Bald Eagle Recovery Plan (Forest Plan, Appendix W) and the Montana Bald Eagle Management Plan (Forest Plan, Appendix II). This is consistent with Forest Plan standards for bald eagle management (Forest Plan, p. II - 28). There will be no further analysis of bald eagle habitat in this document.

NORTHERN ROCKY MOUNTAIN WOLF
(*Canus lupus irremotus*)

USFWS Status: Endangered
USFS Region 1 Status: Endangered

Presence

The Idaho Panhandle National Forests do not have any lands designated for wolf recovery. Maintenance of travel corridors with emphasis on the Coeur d'Alene and St. Joe river drainages is an objective of the Forest Plan (Forest Plan p.II-6).

Northern Idaho and Northwestern Montana have been identified as a dispersal corridor for movements between British Columbia and Central Idaho. Both the Kootenai and Moyie River valleys would seem to form natural travel corridors as both rivers flow across the U.S. Canadian border. However, both valleys are populated by people and livestock. Ungulates are also funneled into the river valleys in the winter. The potential for human-caused mortality would be high for any wolves following ungulates to winter ranges in the valley (Hansen, 1986).

Existing Situation

Gray wolves may occasionally occur in or near the Decision Area. Hansen, 1986 states that three probable wolf reports have been collected from the Moyie River drainage near and adjacent to the north end of the Decision Area. Reports of varying degrees of reliability are received by the district on a yearly basis.

Analysis Methods

All alternatives will close newly constructed roads. New roads will be gated or barricaded according to the alternative. In addition, temporary gates will be erected during sale activities in order to preclude establishing public use patterns. New roads will be opened for a few months during the year following harvest activities to allow for fuelwood gathering and will be closed before elk rifle season. Access management through road closures will minimize increases in motorized activity.

Consistency with the Forest Plan

Forest Plan standards for wolves on the Idaho Panhandle are to consider maintenance of a high number of prey species (deer, elk) and maintenance of security through road management (Forest Plan, p. II-28). This is to provide security habitat and an ungulate prey base for transitory animals.

The risk of wolf mortality will be minimized through road closures. Access management through road closures in winter range will allow dispersing wolves, if they occur, to have relatively secure access to an ungulate prey base. This proposal is consistent with the standards of the forest plan. Effects on wolves is not a significant issue and therefore will not be assessed further.

GRIZZLY BEAR
(*Ursus arctos*)

USFWS Status: Threatened
USFS R1 Status: Threatened

Presence

Grizzly bears were historically present in all of Boundary County. There is one recent reliable grizzly bear record from the Decision Area. Occasional grizzly sightings have occurred to the north of the Decision Area on the Mission-Harvey Mountain complex. The Decision Area is located approximately two miles west of the Keno Grizzly Bear Unit. Transient grizzly bear may occasionally use the area.

Existing Situation

The Decision Area is located outside areas designated for grizzly bear recovery in Boundary County. The Decision area is functionally a habitat island separated from the Keno Bear Unit by the moderately populated Moyie River valley and from the Mission/Harvey Mountain complex (and adjacent Canada) by Round Prairie and highway 95.

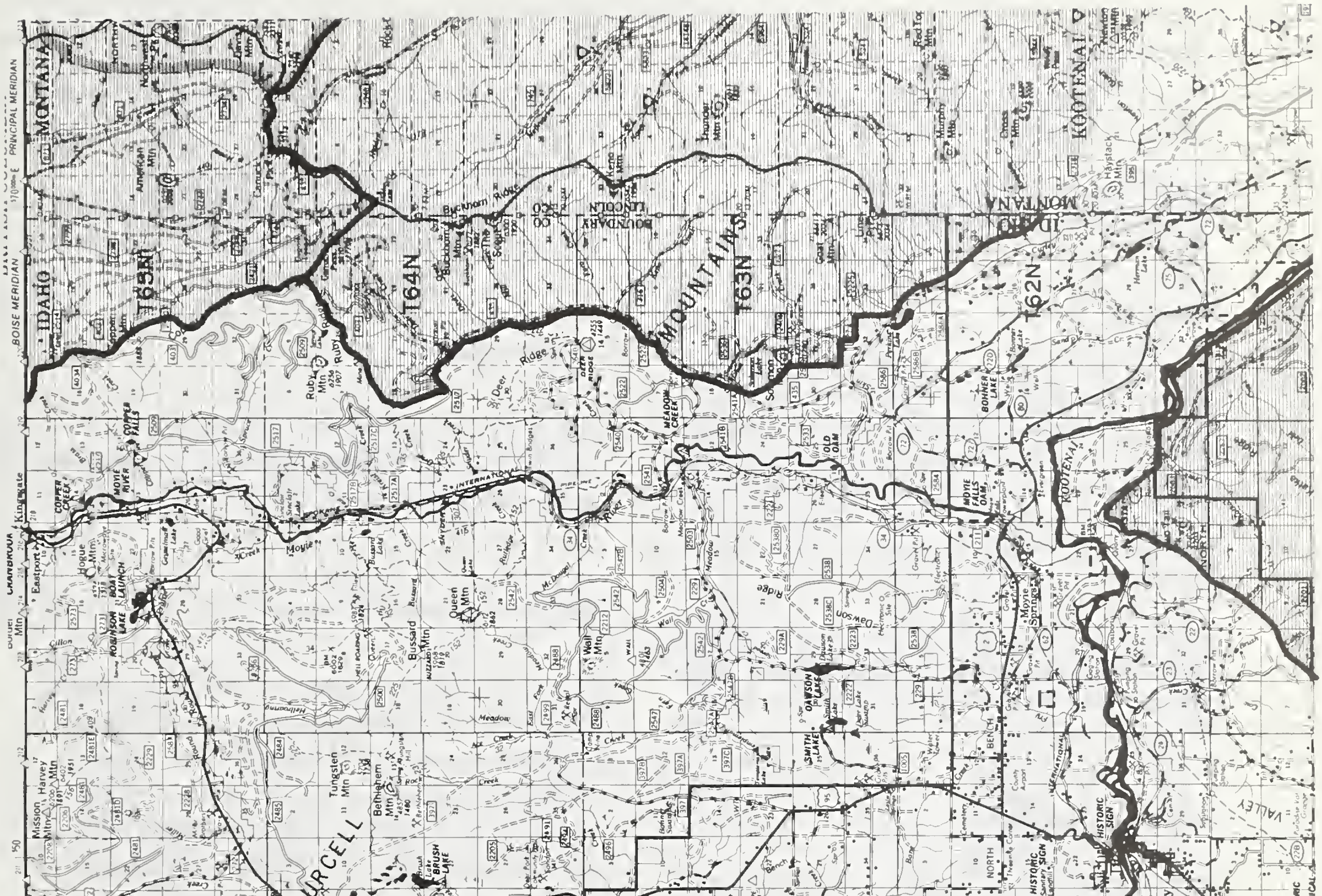
Analysis Methods

All alternatives will close newly constructed roads. New roads will be gated or barricaded according to alternative. In addition, temporary gates will be erected during sale activities in order to preclude establishing public use patterns. New roads will be opened for a few months the year following harvest activities to allow for fuelwood gathering and will be closed before elk rifle season. Access management through road closures will minimize increases in motorized activity and risk of mortality to transient grizzly bears.

Consistency with the Forest Plan

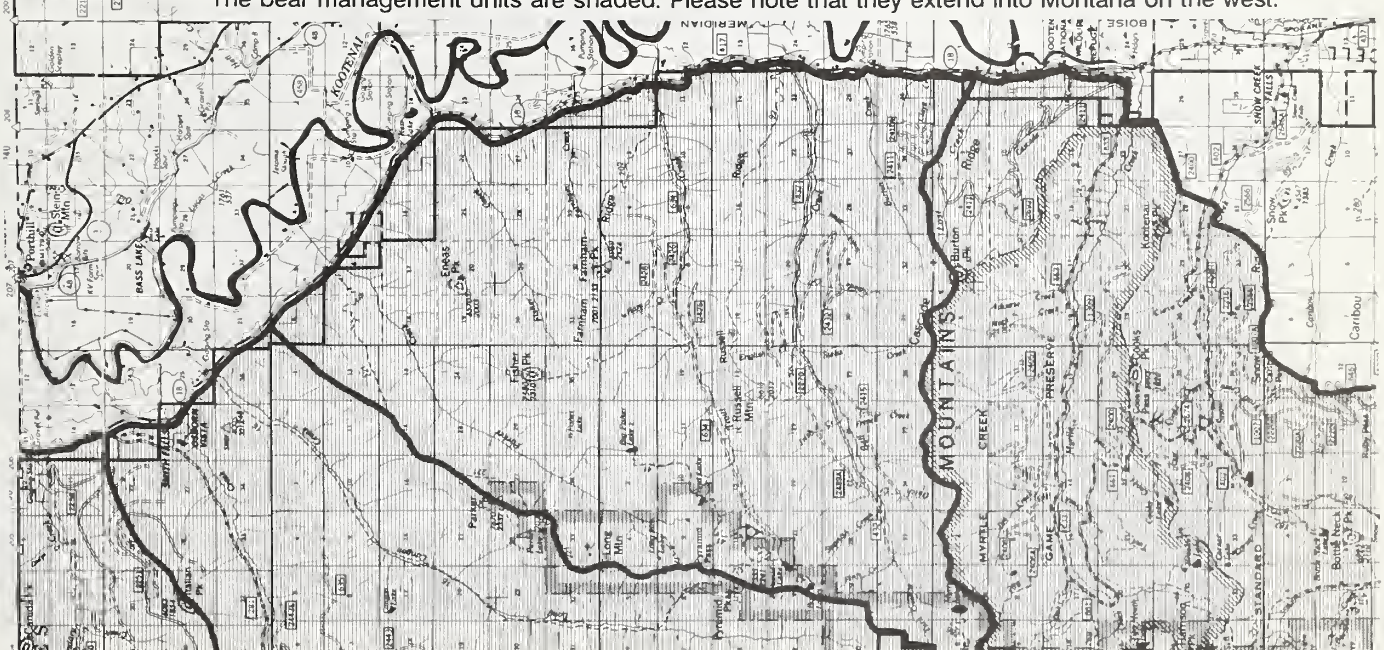
The Decision Area is located outside areas designated as essential to grizzly bear recovery. Resource management activities proposed for

the West Moyie do not need to follow grizzly habitat management guidelines. Access management, although primarily for big game security, will also provide security for transient grizzly bears. This is consistent with management area direction for the Decision Area. No further analysis of grizzly bear habitat will occur in the document.



MAP FIGURE D-3 SHOWS THE RELATIONSHIP OF THE WEST MOYIE DECISION AREA AND THE GRIZZLY BEAR HABITAT MANAGEMENT UNITS IN NORTHERN IDAHO .

The bear management units are shaded. Please note that they extend into Montana on the west.



MOUNTAIN CARIBOU
(*Rangifer tarandus caribou*)

USFWS status: Endangered in ID
USFS R1 status: Endangered in ID

Presence

Mountain caribou were historically present on the Decision Area. Flynn (1956) reported four caribou near the Moyie River between Eastport and Addie in 1954. This is the last known record of caribou from or near the Decision Area. Historic reports also came from Mission Creek, located northwest of the Decision Area and from Deer Creek to the east.

A survey of telemetry locations of transplanted caribou dispersing from the Selkirk Ecosystem reported no locations from the Decision Area. (Compton, 1989).

Existing Situation

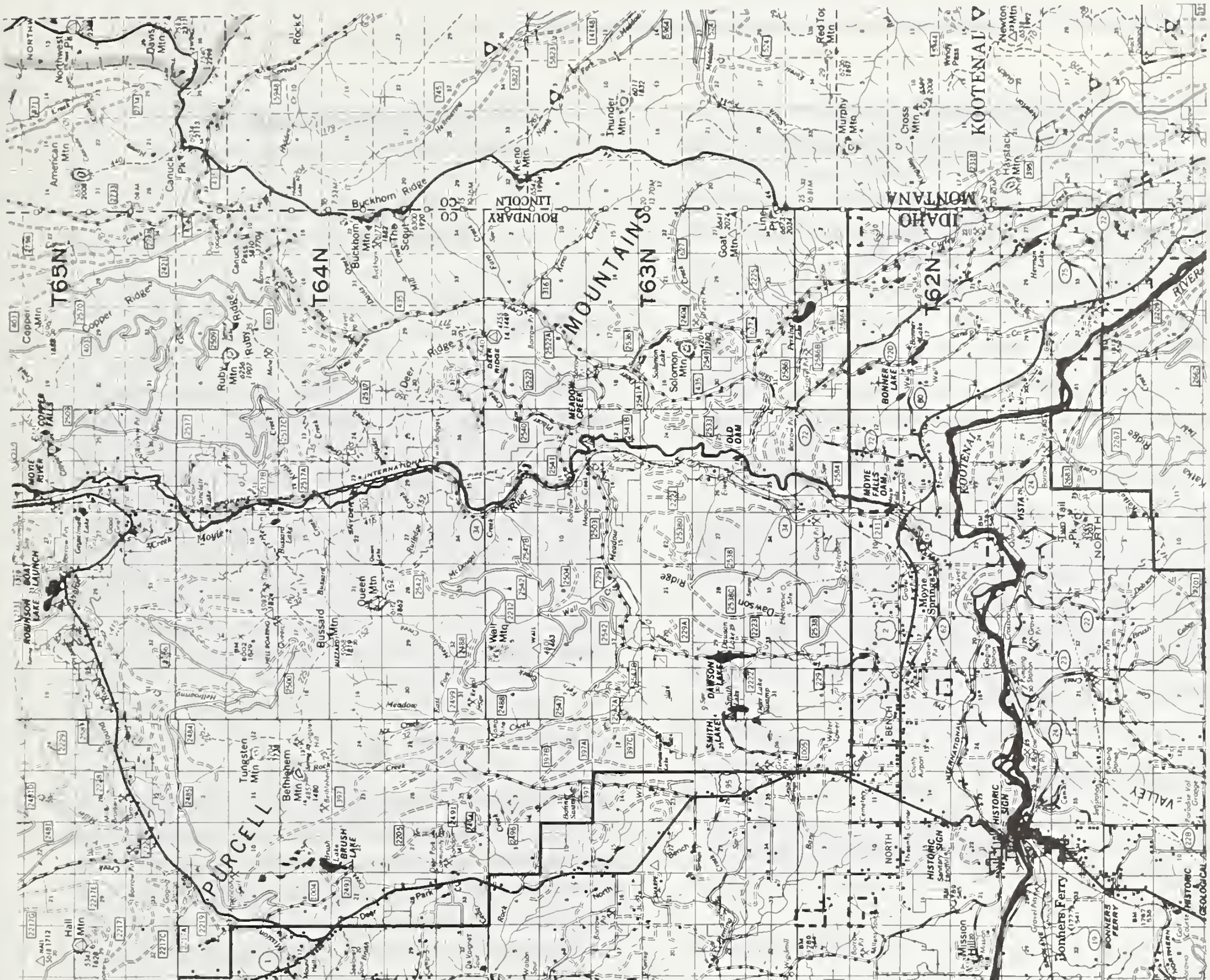
The Decision Area is located 11 miles to the east of the caribou recovery zone in the Selkirk Mountain Ecosystem. Suitable habitat occurs in the Decision Area above 4,500 feet and is limited in area. It is separated from large areas of contiguous habitat in the Purcell Mountains to the east and Canada to the north by valleys.

Analysis Methods

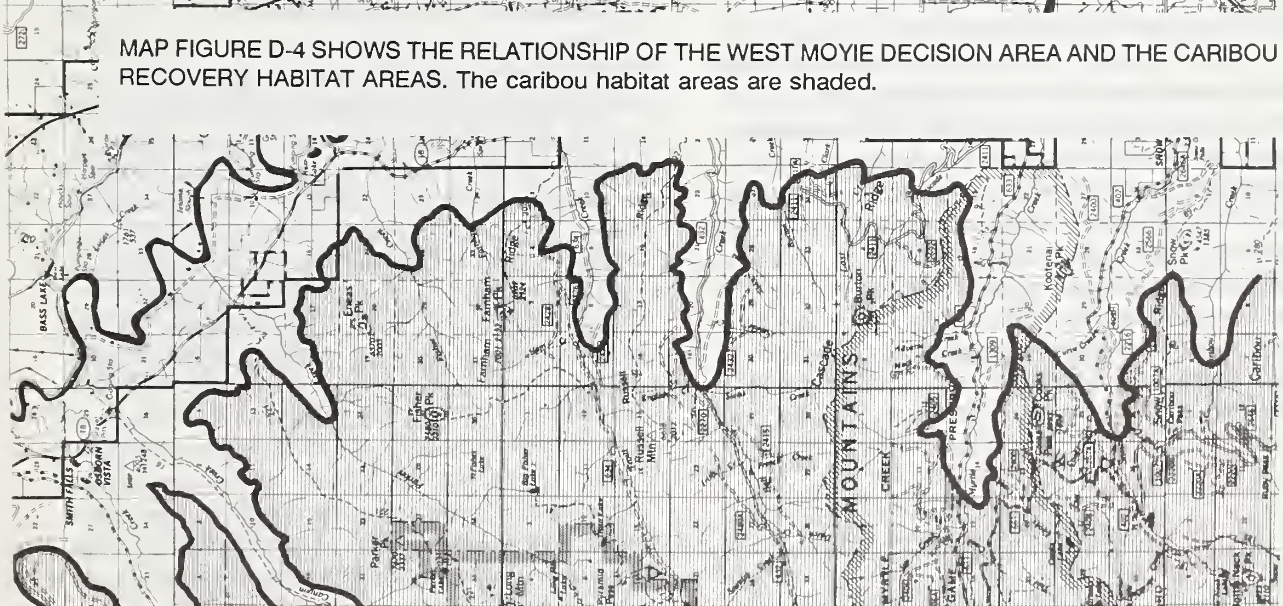
There will be no alternative analysis of caribou habitat since the Decision Area is located outside of the caribou recovery zone.

Consistency with the Forest Plan

The Decision Area is located outside of the area designated for caribou recovery in the Selkirk Mountain Ecosystem. Current direction on the IPNF is to manage for caribou habitat only in identified recovery areas. The proposed actions are consistent with Forest Plan management area direction.



MAP FIGURE D-4 SHOWS THE RELATIONSHIP OF THE WEST MOYIE DECISION AREA AND THE CARIBOU RECOVERY HABITAT AREAS. The caribou habitat areas are shaded.



PEREGRINE FALCON
(*Falco peregrinus anatum*)

USFWS Status: Endangered
USFS Region 1 Status: Endangered

Presence

The peregrine falcon is presumed to be a rare migrant through the Moyie River corridor. Peregrine falcons use cliff ledges, rock outcrops or talus slopes for nesting. Within the Decision Area, there are no large cliffs which would provide breeding habitat. The nearest suitable breeding habitat is located eight miles to the northwest of the Decision Area, on large cliffs facing the Kootenai River valley south of Creston, British Columbia. There are no known historic peregrine sightings from the Decision Area.

Analysis Methods

Based on the lack of suitable breeding habitat, there will be no analysis of peregrine falcon habitat.

Consistency with the Forest Plan

Peregrine falcons will be reintroduced near historic breeding sights in the Clark Fork delta, approximately 46 air miles south of the Decision Area. Reestablishing the peregrine falcon is consistent with Forest Plan standards (Forest Plan, p. II-28). The lack of suitable breeding habitat precludes introduction of the peregrine falcon into the Decision Area. There will be no further analysis of the peregrine falcon or its habitat in this document.

SENSITIVE SPECIES

BIG EARED BAT
(*Plecotus townsendi*)

Presence

There are no known locations of Townsends Big-eared bats in the Decision Area. Townsends big-eared bats have been found in a wide variety of habitats, from arid juniper/pine forests to high elevation mixed-coniferous forests (Reel et al., 1989). Winter roost sites and nursery colonies generally occur in caves and abandoned mine shafts. The only known possible roost sites occur around Tilly mine, in abandoned mine shafts. These sites have not been investigated to date.

Analysis Methods

The indicator for Townsends Big-eared bat is disturbance of possible roost sites through management activities. For all alternatives, the possible roost sites in mine adits at the Tilly mine site will be protected for historic reasons. This protection will also protect townsends big-eared bats if they occur there.

If management activities are found to impact a newly discovered population, a biological evaluation will be written which would analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole (USDA, Forest Service, 1989f). If deemed necessary, a management plan would be developed to avoid or minimize impacts to the local population. There will be no further analysis of the big-eared bat or its habitat in this document.

COEUR D'ALENE SALAMANDER
(*Plethodon vandykei idahoensis*)

Presence

The Coeur d'Alene salamander is classified as a sensitive species by Region 1 of the USFS and is, also, listed as a Species of Special Concern by Idaho Fish and Game. One population has been discovered at Copper Falls, northeast of the Decision Area. Coeur d'Alene salamanders have been located in the Decision Area at Little Hellroaring Falls (Christensen 1989). Other possible sites in the Decision Area were surveyed and no salamanders found.

The major habitat characteristics required by Coeur d'Alene salamanders are; moisture, moderate temperatures, a relatively constant microenvironment, and fractured rock which provide protection from desiccation and predation (Wilson and Smith, 1987). These conditions are usually associated with three types of microhabitats: seepages, waterfall spray zones and certain streamside zones (Wilson and Smith, 1987) and (Groves, 1988). Rock fractures and interstitial space are important for hibernation, predator escape, and thermal stability. Hydric stability is provided by seeps, streamsides, and waterfalls, and is often indicated by bryophyte growth. Coeur d'Alene salamander feed on fly larvae and other aquatic and semi-aquatic insects (Wilson and Smith, 1987).

The Coeur d'Alene salamander is most sensitive to changes in microenvironment and increases in water flow (Wilson and Smith, 1987). Timber management activities which cause changes to critical microhabitat could reduce or eliminate existing Coeur d'Alene salamander populations. Overstory removal along streams or directly above microhabitat would, seasonally, reduce water yield and increase flooding (Wilson and Smith, 1987). Reductions in water yield could leave microhabitat without sufficient moisture to support salamanders, while flooding would reduce hiding cover and hibernation space (Wilson and Smith, 1987).

The Little Hellroaring Falls population inhabits the spray zone at the base of the first waterfall. The lower face of the falls is composed of fractured rock and seeps, providing cover and thermal stability. Additional habitat is present above the falls where a talus slope enters the creek. Maintaining watershed quality relative to water temperature, moisture, and a constant microenvironment is necessary for salamander population stability.

Existing Condition

Timber harvesting from the Little Hellroaring Sale has increased the peak runoff for 1990 to 7% above natural conditions with a gradual decrease in peak runoff levels beginning in 1993. Due to the structure of Little Hellroaring Falls, it is unlikely that a 7% increase in runoff would have a significant effect on the existing salamander population. The units of the Little Hellroaring Sale will not remove any of the overstory adjacent to Little Hellroaring Creek, and the harvest activities will not significantly change the water temperature (Collette, 1989).

Analysis Methods

The indicators for Coeur d'Alene salamander are: a) maintenance of water yield stability, b) maintenance of water temperature, and c) maintenance of existing cover shading the site.

For all alternatives, there would be no change in thermal stability of Coeur d'Alene salamander microhabitat. No overstory removal would take place along streamside habitat or upstream from critical microhabitat. This insures a stable microenvironment and constant water temperature along existing salamander habitat. Water yield stability would be maintained for all alternatives and will be evaluated on a drainage-specific basis.

Consistency with the Forest Plan

The IPNF Forest Plan states that; habitat of species in the Regional Sensitive Species List will be managed to prevent further declines in

populations which could lead to federal listing under the Endangered Species Act (Forest Plan, p. II-28). Coeur d'Alene salamander habitat would be protected by maintaining water yield stability and water temperature of Little Hellroaring Creek. There would be no overstory removal along Little Hellroaring Creek or in adjacent drainages suitable for Coeur d'Alene salamander habitat.

SPECIES OF SPECIAL CONCERN

The Idaho Department of Fish and Game defines Species of Special Concern as: Species with restricted ranges, specific habitat requirements, or low numbers which make then vulnerable to elimination from the state. Category A species meet one or more of the criteria above **and** for which Idaho presently contains or formerly constituted a significant portion of their range (i.e. priority species).

Category B species meet one or more of the criteria above **but** whose populations in Idaho are on the edge of a breeding area that falls largely outside the state (i.e. peripheral species). (Idaho Department of Fish & Game, correspondence. 1989)

COMMON LOON
(*Gavia immer*)

IDFG Status: Sensitive
(Category A)
USFS R1 Status: Sensitive

Presence

Lakes 10 acres in size or larger are required in order to be suitable for breeding loons. Bussard, Sinclair and another unnamed lake by Good Grief are all less than 8 acres and do not meet the size requirements necessary for breeding loons. There are no loon sightings from these lakes. Loons are seen on a yearly basis on nearby Robinson Lake, including a pair in May of 1989 which appeared to be prospecting for a nest site.

Analysis Methods

Based on the lack of suitable breeding habitat, there will be no analysis of alternatives.

Consistency with the Forest Plan

The habitat of species listed in the Regional Sensitive Species list should be managed to prevent further declines in populations which could lead to federal listing under the Endangered Species Act (Forest Plan, p. II-28). The lack of suitable habitat in the Decision Area precludes any discussion about consistency with the Forest Plan.

HARLEQUIN DUCK
(*Histrionicus histrionicus*)

IDFG **Status:** Species of Special Concern (Category A)

USFS R1 **Status: Sensitive**

Presence

Harlequin ducks are classified as a Sensitive Species by Region 1 of the Forest Service and a Species of Special Concern by Idaho Fish and Game. Harlequins are presumed to be present in the Decision Area. Recent surveys (Wallen and Groves, 1989) found no harlequins present. However, there have been recent unconfirmed sightings on the Moyie River and on Deep Creek (Sieracki, 1989c). These ducks have occurred historically on the Moyie River above the dam (IDFG 1953). Breeding harlequins have been sighted at Hughes Fork in Upper Priest River and at Granite Creek west of Priest Lake (Wallen and Groves 1989). Harlequins have been found on the Yaak River and East Fork Yaak River (USDA Forest Service, 1989d) and one adult with four young were seen on Smith Creek,

Bonners Ferry R.D. The Moyie River was surveyed by the Bonners Ferry R.D. early summer of 1989 and no harlequins were found.

The Western population of Harlequin ducks occurs from the Aleutian Islands along the coast to Northern California and inland to western Wyoming. These ducks winter on the coast and fly inland to breed on mountain streams. They arrive in North Idaho by late April. Individual drakes and non-breeding pairs leave by mid-June while breeding pairs remain until the end of August. Suitable habitat is found along streams located in relatively wide valleys. Harlequins prefer to nest and breed in fast moving streams with a low gradient, shallow channels and islands. They feed on aquatic insects such as stoneflies in clear channels lined with dense riparian vegetation (Wallen and Groves, 1989). Studies show that harlequins require undisturbed areas for nesting and rearing young. Activities affecting streamside vegetation in nesting areas may cause declines in productivity of harlequins. Affecting stream sedimentation will in turn affect aquatic invertebrates and will have long term affects on productivity (Wallen and Groves, 1988).

Existing Condition

High recreational activity along the Moyie River may preclude breeding of harlequins in the area. Harlequins may tolerate some traffic if there is abundant shrub and tree cover, however, water sports such as fishing and rafting may have greater impacts. Round Prairie Creek has suitable nesting habitat for harlequins and also limited recreational use.

Analysis Methods

No proposed action in the Decision Area would influence harlequin ducks. For all alternatives a strip of riparian vegetation would be left along Unit 37 to provide cover along the river. If harlequin ducks were found to breed in the area, a biological evaluation of the necessity to protect the population would be initiated. If the evaluation shows that protection is necessary, a management plan would be developed. Additional surveys on the Bonners Ferry Ranger District will be conducted in 1990 by Idaho Fish and Game. There will be no further analysis of harlequin ducks in this document.

LYNX

Status: USFWS - Candidate in Idaho
IDFG - Species of Special Concern

Presence

Lynx are present at low densities on the Bonners Ferry Ranger District. Although there are no lynx sightings from the Decision Area, suitable habitat exists and it is likely that they inhabit the area.

They are not listed as a sensitive species on the USDA Forest Service Region 1 sensitive species list, but are a candidate for listing as threatened or endangered in Idaho. They are also listed as a Species of Special Concern by Idaho Fish and Game.

Koehler (1987) states that denning sites "were characterized as Mature (≥ 250 year old) stands dominated by spruce and subalpine fir overstory." Large amounts of woody debris are also important for denning site locations. Lynx utilize early seral stages, especially those that provide snowshoe hares (seral lodgepole stands are especially valuable when adjacent to mature or old growth stands).

Analysis Methods

Lynx are also classified as a furbearer by Idaho Fish and Game and are incidentally taken while bobcat trapping. Their pelts command a relatively high price. Maintenance of security habitat to reduce the risk of mortality due to trapping through road closures is the most important management consideration. All alternatives would minimize the increase in risk of mortality through closure of newly constructed roads. There will be no further analysis of alternatives in this document.

WOLVERINE
(*Gulo gulo*)

Status: USFS: Sensitive
USFWS Candidate for Threatened & Endangered
IF&G Species of Special Concern

Presence

Wolverine use of the Decision Area is probably limited to transitory animals which maintain home ranges in either the Selkirk Mountains to the northwest, or the Purcell Mountains to the north and east (Hash, 1989b) and (Hanna, 1989). Although there are no documented wolverine sightings within the Decision Area, between 1960 and 1987 three confirmed and 11 probable sightings have been made in northern Idaho, three of which were within five miles of the Decision Area.

Existing Condition

The wolverine is classified as a Sensitive Species by Region 1 of the Forest Service, a candidate for federal listing as Threatened and Endangered, and a Species of Special Concern by Idaho Fish and Game. The IPNF Forest Plan standards state: "Manage the habitat of species listed in the Regional Sensitive Species List to prevent further declines in populations which could lead to federal listing under the Endangered Species Act." Management activities proposed for the West Moyie Decision Area were evaluated for their effects on wolverine.

Very little information exists on wolverine distribution in Idaho. Wolverines occupy large areas of undisturbed habitat such as, wilderness and roadless areas (Hash, 1989b). Due to their dependence on carrion, wolverines maintain large home ranges averaging more than 154 square miles (Groves, 1987). The Decision Area is approximately 33 square miles and is much too small to support resident wolverine, however, it may be used seasonally by residents from adjacent populations or by transients.

In areas where trapping occurs, maintaining security habitat is very important for wolverine. Because of its curious nature and dependence on carrion, the wolverine is frequently trapped, and often escapes injured (Hash, 1989b). This reduces the fitness of individuals and, if it occurs frequently enough, will significantly affect the population (Hash, 1989b).

Analysis Methods

To provide wolverine security habitat, all alternatives would include year round closure of newly constructed roads. All new roads would be closed after logging is completed to maintain security habitat. This would limit motor vehicle traffic and other human disturbance.

Several alternatives provide for maintenance of white-tailed deer winter range and will, subsequently, provide carrion for wolverine during the winter and spring seasons.

Consistency with Forest Plan

Wolverine security habitat would be provided by access management which minimizes risk of mortality. Access management in big game winter range would enable transitory wolverines to use the potential food source available. Maintaining existing security habitat and big game winter range would not exclude transitory animals from utilizing the Decision Area. This would not reduce habitat or population numbers of wolverine which could lead to federal listing under the Endangered Species Act. There will be no further analysis of wolverines or their habitat in this document.

MANAGEMENT INDICATOR SPECIES

PILEATED WOODPECKER
(*Dryocopus pileatus*)

IPNF Status: Management Indicator

Presence

Pileated woodpeckers are present throughout the Decision Area. Sightings, excavations and calls of pileated woodpeckers have been documented in many locations within the Decision Area (Sieracki, 1989b).

Pileated Woodpeckers are dependent on timber stands containing large (greater than 21 inches DBH) dead or live defective trees for nesting habitat, and show a strong preference for nesting trees 30 inches DBH or larger (McClelland, 1989). Typical nest stand conditions can best be described as old-growth stands with a decadent overstory of western larch, ponderosa pine or black cottonwood (USDA Forest Service, 1989c). Heart rot appears to be an important feature of suitable nest trees, softening the heartwood, while retaining a shell of sound sapwood. Sound trees may be used (Schroeder, 1983).

Feeding habitat for the pileated woodpecker is tied primarily to the availability of carpenter ant colonies (USDA Forest Service, 1989c). Ant colonies occur most often in large snags with advanced decay, the moist decaying butts of live trees, logs greater than 10 inches in diameter, and natural or cut stumps. Carpenter ants select stands of high canopy cover, and especially favor fire scarred or butt rotted western red cedar (USDA Forest Service, 1989c).

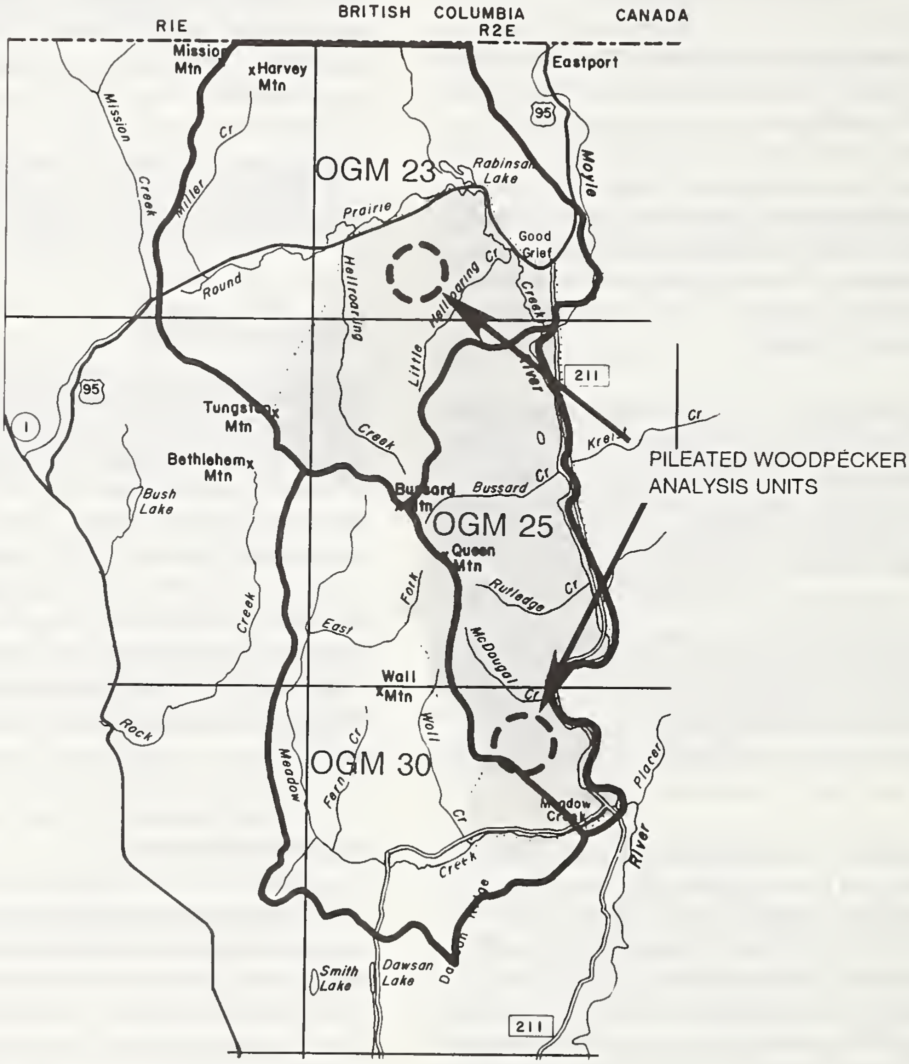
"The availability of winter feeding habitat appears to be the limiting factor for pileated woodpeckers in the northern Rocky Mountain populations. Deep snowpack in these areas make logs and low stumps unavailable to feeding woodpeckers. Additionally, during the winter few insects are available on tree boles, and pileated woodpeckers must excavate deep cavities into standing boles to search for ant colonies. If snags and high stumps are not present, the habitat may be unsuitable to support a resident population" (USDA Forest Service, 1989c).

Existing Condition

An analysis of the existing conditions showed that suitable nesting and winter feeding habitat are present to support one breeding pair of pileated woodpeckers for each analysis unit within the Decision Area. Providing habitat for two nesting pairs in OGM units 23 and 25 will not insure viability of the population on the IPNF. However, Jerry (1983) suggests maintaining at least one breeding pair on each 10,000 acre OGM unit within the Forest should provide for a self-sustaining population of pileated woodpeckers.

Analysis Methods

The availability of suitable nesting and winter feeding habitat are considered the primary limiting factors for pileated woodpecker populations. The Habitat Suitability Index (HSI) model, developed by Region One of the Forest Service, was used to assess the existing and predicted stand conditions within the Decision Area for suitability as pileated woodpecker habitat.



Map of Old Growth Management Units and the Pileated Woodpecker Analysis Units

Four ecological characteristics; canopy closure, dominant overstory species, dead or live defective tree density and average dead or live defective tree DBH were evaluated. This provided an index to nesting and feeding habitat value for individual stands and multiple stand analysis areas.

For multiple stand analysis, two 1000-acre pileated woodpecker habitat analysis units were identified. These analysis units were centered on the designated old growth stands within the portion of Old Growth Management (OGM) units 23 and 25 which lie within the Decision Area. No analysis unit was designated for OGM unit 30. The minimum HSI thresholds for standard nesting

and feeding acres necessary to provide sufficient habitat for one nesting pair per analysis unit is 100 acres and 250 acres, respectively.

The portions of OGM unit 30 contained in the Decision Area are too small and too dispersed to provide sufficient habitat for a breeding pair of pileated woodpeckers (see Old Growth Management Unit Map on preceding page). However, large areas of mature and old growth timber do exist within the OGM unit 30, adjacent to the Decision Area. These areas may provide sufficient habitat to support a pair of pileated woodpeckers. However, because the proposed alternatives will not effect the quality or quantity of pileated woodpecker habitat within OGM 30, habitat suitability for the entire compartment will not be evaluated.

Effects Common to All Alternatives

Direct Effects

All alternatives retain sufficient nesting and feeding habitat to support one breeding pair of pileated woodpeckers within each of two 1000 acre woodpecker analysis units.

The pileated woodpecker nesting and feeding habitat in compartment 738 will not be effected by activities proposed under any of the alternatives being considered.

All alternatives will follow the IPNF Snag Management Guidelines requiring the retention of 1 snag and 2 snag replacement trees per acre in all cutting units accessed by road. Snags will be felled in all helicopter logging units, but snag replacement trees will be retained. The retention of snags and replacement trees at this level will maintain snag habitat within the Decision Area at a minimum level of 40 percent of potential.

Standard Feeding and Nesting Acres Per Analysis Unit

ALTERNATIVE	UNIT ONE Nesting Acres	UNIT ONE Feeding Acres	UNIT TWO Nesting Acres	UNIT TWO Feeding Acres
A (Existing)	303	452	106	576
B2	297	422	102	523
D	297	422	106	554
E	296	420	106	576
EH	245	407	106	565
H	297	421	106	554
I	291	422	106	554
J1	239	401	106	566
J2	239	401	106	566
J2H	239	401	106	566
K	239	401	106	566

Indirect Effects

Public firewood gathering is unrestricted on much of the Decision Area, severely reducing the long term availability of snags used for feeding and nesting by pileated woodpeckers and other cavity nesting species. Firewood gathering may reduce or eliminate snags 200 feet on each side of an open road (USDA, 1985). This results in a loss of 48 acres of potential snag habitat for each mile of road.

Cumulative Effects

Pileated woodpeckers are an old growth related species strongly tied to the availability of large snags (FP Appendix 27, 1981). Current Forest Plan direction is to manage for a viable population of woodpeckers across the Forest. Forest Plan standards require maintaining as least one breeding pair of pileated woodpeckers for each 10,000 acre OGM unit on the Forest (FP Appendix 27, 1981). Therefore, suitable habitat must be retained in each of the OGM units to insure the long-term viability of the pileated woodpecker population inhabiting the Decision Area. The activities proposed under all alternatives will retain sufficient habitat to support at least one pair of pileated woodpeckers for each of the two OGM units contained within the Decision Area. Future management activities in the Decision Area may reduce the suitability of the area for pileated woodpeckers.

Possible Effects of Other Jurisdictions

The private land holdings along the northern and eastern borders of the Decision Area contain areas of suitable nesting and feeding habitat. Timber harvesting on private land could reduce the quality and quantity of pileated woodpecker habitat within the Decision Area, but would not affect the analysis units previously displayed.

Consistency With the Forest Plan

Standards in the IPNF Forest Plan require that sufficient habitat be maintained to support at least one pair of pileated woodpeckers within each old growth management unit on the Forest (IPNF Forest Plan, p. II-28). The Decision Area includes 7208 acres of OGM unit 23 and 8705 acres of OGM unit 25. All alternatives retain habitat of sufficient quality and quantity to support at least one breeding pair of pileated woodpeckers for each of the OGM units being evaluated. This is consistent with Forest Plan standards for managing pileated woodpeckers on the IPNF.

CAVITY AND SNAG USING SPECIES

Presence

Snags, broken-topped live trees, and down logs are used by a great variety of wildlife species for nesting, denning, perching, roosting, feeding and cover. Forty-two species of birds, fourteen species of mammals, and several species of amphibians are recognized as totally or largely dependant on cavity habitat on the Idaho Panhandle National Forests. Snags located where they can eventually fall into streams and lakes are important in contributing to aquatic habitat through creation of pools, cover and spawning beds. They also provide organic energy input to the stream (Forest Plan, Appendix X).

Snags also have economic value. They provide the habitat by which insectivorous birds and mammals, predatory insects and microbes help hold forest insect populations at endemic (natural) levels. Dead trees provide an energy source for the human community (Forest Plan, Appendix X).

Existing Situation

Management Area 4, Snag Management Area 1, remains below standards for Management Area 4 in Forest Plan Appendix X. The lack of cavity nesting habitat is a result of management activities capturing mortality from severe ice storm damage on the north portion of Decision Area. See table, page D-18 for existing snag habitat conditions.

Analysis Methods

The Decision Area has been divided into four snag management areas (SMA's) which are based on timber compartment and subcompartment boundaries. These areas are designated to improve the clarity of the analysis. There are no snag management areas delineated by the Forest Plan. See table page D-18 for a list of snag management areas.

Only the portion of compartment 738 which overlaps the Decision Area is included in the analysis. Management area 16 occupies less than one percent of the Decision Area and would not be included in the analysis.

The recommended minimum level necessary to maintain a viable population of cavity nesting species is 40 percent of their potential (Forest Plan, Appendix X). The IPNF manages for different levels of potential habitat by management area (MA). There are four management areas which occur in the Decision Area, MA 1, 4, 9, and 16. See table on page D-18 for minimum snag management potential guidelines.

This analysis utilized these assumptions:
1. uncut lands meet 100 percent of cavity nesting habitat,
2. lands 200 feet on each side of the center of the road have no cavity nesting habitat because they are designated in the Forest Plan for fuelwood collection,
3. existing cutting units have no cavity nesting habitat potential, and
4. new cutting units would comply to standards for the management area they occur in.

Effects Common to All Alternatives

Direct and Indirect Effects

All alternatives are below snag management standards for MA 4 in snag management area 1.

All action alternatives would result in the loss of cavity nesting habitat. The amount of loss would vary with alternative. The reduction is caused by timber management and fuelwood gathering along roads. The majority of management areas in the snag management units exceed cavity nesting standards.
All action alternatives would impact MA 9 ground. Appendix X (Snag Management Guidelines) states that MA 9 land would be managed in its natural state. Impacts of timber harvest and road construction on cavity nesting habitat will be mitgated by closing newly constructed roads and leaving snag recruitment trees.

Over the ten year period, a minimal number of quality snags would be created through natural mortality. Blister rust may create a significant number of white pine snags in the mixed conifer stands. Bark beetle activity may create a significant number of snags in lodgepole dominated stands. Lodgepole pine snags generally do not provide suitable nesting habitat. However, bark beetle activity would provide a food source for woodpeckers such as the black-backed and three-toed which can exploit irregularily occuring food sources such as bark beetle infestations.

Cumulative Effects

Small sales may be scheduled to capture mortality from windthrown trees in and around cutting units. These would cause a minimal, but unknown amount, of reduction of cavity nesting habitat. Snag management guidelines appropriate to the management area would be followed in this event.

Future timber management activities would affect cavity nester habitat. To insure that viable populations of cavity nesters will be maintained, snags and replacement trees would be designated in all units. The number of snags and replacement trees to be designated would be addressed in the silvicultural prescription and marking guide for that unit (Forest Plan standard, Appendix X). This would insure retention of snag replacement trees, and prevent them from inadvertently being harvested during future sales.

Effects of Other Jurisdictions

There are no known Effects of Other Jurisdictions to cavity nesting habitat in the Decision Area.

Consistency With the Forest Plan

For all alternatives, MA 4 in SMA 1 does not meet Forest Plan standards and is inconsistent with Forest Plan direction. Management areas which do not meet standards are highlighted in the table on page D-18. Those management areas which do not meet Forest Plan standards would not provide their share towards maintenance of viable cavity nesting populations.

Reduction of cavity nesting habitat in MA 9 does not meet standards set for that management area in Appendix X of the Forest Plan. However, timber harvest (salvage and firewood gathering) may be allowed on patches of suitable ground embedded in MA 9 (Forest Plan, p. III-40) and the loss of cavity nesting habitat may be mitigated. All areas which do not meet FP standards would be mitigated through the designation of snag replacement trees and the closure of newly constructed roads.

Effects

SNAG MANAGEMENT ANALYSIS

Compartment	Managment Area	Percent of Potential	A	B2	D	E	EH	H	I	J1	J2	J2H	K
727-2,5	MA1	40%	72	59	59	60	59	59	60	59	59	65	65
	MA4	60%	**23A**	**23**	**23**	**23**	**23**	**23**	**52B**	**23**	**23**	**23**	**23**
	MA9	100%	100	97	100	100	100	99	100	100	100	100	100
730-1,2,3	MA1	40%	93	61	67	73	43	63	72	66	55	55	55
	MA4	60%	98	98	98	93	94	80	87	94	94	94	94
	MA9	100%	100	98	97	99	71	98	100	98	87	72	82
735-1,2	MA1	40%	64	43	45	47	**21**	49	**27B**	47	**36**	**30**	**23**
	MA4	60%	88	79	88	88	88	88	89	88	88	88	88
	MA9	100%	92	89	90	91	81	91	92	92	91	80	80
738-2,5P D	MA1	40%	80	60	61	61	63	58	65	66	61	72	68
	MA4	60%	ERRC	ERR	ERR	ERR	ERR	ERR	**40B**	ERR	ERR	ERR	ERR
	MA9	100%	93	90	93	93	93	92	96	93	93	93	93

TABLE NOTES:

A	Value does not meet snag guidelines due to harvest after ice storm damage.
B	Reflects Management Area change.
C	There is no MA4 in the existing compartment.
D	P designates Partial compartment analysis
*	No objectives; managed in a "natural state".
MA	Management Area as defined in the Forest Plan
BOLD TEXT	Values in **Bold Text** are Management Areas which do not meet guidelines.

MOOSE
(*Alces alces*)

Presence

Moose are frequently seen around Queen Mountain, Sinclair Lake, and Round Prairie Creek. The moose population in general seems to be increasing in North Idaho. This may be in response to the early successional stages created through timber management. "Rotation system logging can provide a series of temporary type habitats (a shifting mosaic) that may result in a permanent moose population" (Matchett, 1980).

Existing Situation

The Decision Area provides a variety of seasonal habitat components. Year round components exist in the wetlands complex associated with Round Prairie Creek and Sinclair Lake. Adjacent timbered stands provide relatively large areas of thermal and hiding cover. Moose tend to calve on easterly aspects (Matchett, 1980). Cows and calves are commonly seen in the area during the summer. It is likely that they utilize the eastern face of the Decision Area to calve. Moose frequent the mesic subalpine fir habitat types near Queen Lake in the summer.

Mature stands with pacific yew understory are important to wintering moose on the southern part of the forest. No stands with pacific yew understory were found during a field review of the area. A query of the database indicates that there are no stands with cedar/clintonia/pacific yew habitat type below 4,300 feet. Moose are not likely to use these stands during the winter because of their elevation.

These animals are often encounter while traveling along mountain roads. Their relative lack of fear makes them easy prey for poachers. The risk of poaching will be minimized through road closures planned for all alternatives. There will be no further analysis of this animal in this document.

Analysis Methods

Moose are one of the management indicator species selected by the Idaho Panhandle National Forests. It is assumed that meeting the needs for elk on summer range and white-tailed deer on winter range will meet the needs of moose.

United States Department of Agriculture
Forest Service
Bonners Ferry Ranger District
(208)267-5561
Route 4, Box 4860
Bonners Ferry, ID 83805-9764
FAX (208)267-7423

Reply to: 2672.41

Date: March 8, 1991

Subject: West Moyie Environmental Impact Statement
Biological Assessment

To: District Ranger

This Biological Assessment (BA) addresses the area identified as the Decision Area in the West Moyie Environmental Impact Statement (EIS),(U.S. Forest Service 1991). The Decision Area is described in full in the EIS.

Alternative K, the preferred alternative, would harvest approximately 15.9 MMBF in four timber sales. It would leave about 2000 acres in an unroaded condition. Access to treat harvest units would require 8.7 miles of road construction and 8.4 miles of reconstruction.

There would be no clearcutting with this alternative. Even-aged regeneration harvesting would consist of shelterwood systems. After regeneration is established, these stands would be re-entered to remove a portion of the overstory. The final overstory removal would not occur until the stand of regeneration has grown to the point where past management activities are not noticeable (approximately 50 to 60 ft. in height).

A total of 3098 acres would be treated in 63 cutting units. Of these, 140 acres would be seed tree harvested and 273 acres would be shelterwood harvested, for a total of 413 acres of even-aged regeneration harvesting. Forty acres would be harvested using single tree selection uneven-aged regeneration systems. 777 acres would be harvested using group selection form of uneven-aged regeneration system, for an actual harvest area of 78 acres. Sanitation salvage will be implemented between the groups on 181 acres in stands where the group selection system is prescribed. 717 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 491 acres would be commercially thinned to promote growth. The overstory would be harvested on 49 acres. Sanitation salvage harvesting would be implemented on 611 acres to harvest dead, dying and high-risk timber.

Some timber would be cut in riparian areas. Timber would be removed using a salvage/sanitation system from 34,400 feet of streamside area; 800 feet using an Uneven-age management system; 2,000 feet using a Shelterwood harvest system; and 7,400 feet using the commercial thinning harvest system.

Alternative K would provide some winter range browse for white-tailed deer. Thermal cover would be maintained. Harvest unit size would exceed the recommended 10 acres in the high risk lodgepole and white pine stands. Stands that currently provide high value winter range cover would be managed with uneven-aged prescriptions designed to maintain cover within the stand. Timing of logging operations would be managed to reduce disturbance to deer.

On May 24, 1989, the U.S. Fish and Wildlife Service provided the Bonners Ferry Ranger District with a listing of threatened and endangered species that may be present in the project area (attached). The FWS identified one species as probably occurring in the Decision Area, gray wolf (Canis lupus irremotus). The EIS also analyzed the threatened and endangered species that have occurred historically within or near the Decision Area. These are the endangered bald eagle (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus anatum), and mountain caribou (Rangifer tarandus), and the threatened grizzly bear (Ursus arctos horribilis).

BALD EAGLE

IDENTIFICATION OF OCCUPIED HABITAT

The U. S. Fish and Wildlife Service does not list the bald eagle as present in the Decision Area. However, there are reports of both adult and immature bald eagles near the vicinity of Robinson Lake, north of the Decision Area, occurring throughout the year. The Forest Plan's direction on bald eagle management is to emphasize surveys and mapping of nesting, feeding and roost sites and protection of these identified use areas (FP II-6).

Past and current measures utilized by the Bonners Ferry Ranger District for the conservation and recovery of bald eagles include:

Monitoring of reported eagle sightings.
Participation in national mid-winter bald eagle surveys.
Public education/school programs on TES species.

The area analyzed in the EIS for bald eagle habitat includes lands within 1/2 mile of Robinson Lake, Round Prairie Creek and associated wetlands near the north portion of the Decision Area, and the portion of the Moyie River valley on the east side of the Decision Area (see map). There are no known bald eagle nests, winter roosts, or traditional feeding sites in the area. This has been determined through informal field surveys, discussions with residents who are interested in wildlife, and with wildlife biologists familiar with eagles.

The Robinson Lake, Round Prairie Creek and associated wetlands complex has the highest potential in the vicinity for future eagle nesting. This area provides the largest prey base in the analysis area. Large veteran ponderosa pines occur throughout this area for potential nesting sites.

The Moyie River valley serves as a travel corridor for eagles during migration. This corridor is of less importance than larger regional landscape features such as the Kootenai River and associated Purcell Trench. Eagles dispersing from winter concentrations on Lake Koocanusa and Pend Oreille Lake may exploit winter and road-killed deer in the Moyie valley.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

Potential nesting habitat is considered to be mature to old growth stands or stands with large veteran trees within 1/2 mile of Round Prairie Creek, the Moyie River and Robinson Lake. No harvest activity is proposed in any timber stands that meet these criteria. Winter roosting areas are not considered limiting and are available in sufficient quantities. Displacement of bald eagles from winter habitats would be unlikely because of the distance of most proposed stands from potential roosting habitat.

Based on the previous analysis, the proposed action would have no effect on bald eagles or their habitat.

MEASURES FOR AVOIDING POTENTIAL ADVERSE EFFECTS

New nesting sites, if they occur, would be managed in accordance with the Pacific States Bald Eagle Recovery Plan. This is consistent with Forest Plan standards for bald eagle management. A management plan would be established, in coordination with US FWS, before any activities proceed.

There are some stands of immature sawtimber located near the Moyie River proposed for harvesting. These stands would have snag recruitment trees designated according to snag management guidelines. Maturation of these recruitment trees would provide for future nest sites in these stands. A buffer zone would be left between these stands and the Moyie River which would provide for future perch trees along the river's edge.

PEREGRINE FALCON

IDENTIFICATION OF OCCUPIED HABITAT

The peregrine falcon is presumed but not known to be a rare migrant through the Moyie River corridor. Peregrine falcons use cliff ledges, rock outcrops or talus slopes for nesting. Within the Decision Area, there are no large cliffs which would provide breeding habitat. The nearest suitable breeding habitat is located eight miles to the northwest of the Decision Area, on large cliffs facing the Kootenai River valley south of Creston, British Columbia. There are no known historic peregrine sightings from the Decision Area.

Past and current measures utilized by the Bonners Ferry Ranger District for the conservation of the peregrine falcon include:

Monitoring of reported sightings.
Funding of 1989 hacking site survey on the district.
Public education/school programs on TES species.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

Based on the lack of suitable breeding habitat, the proposed action would have no effect on peregrine falcons or their habitat.

NORTHERN ROCKY MOUNTAIN WOLF

IDENTIFICATION OF OCCUPIED HABITAT

Gray wolves may occasionally occur in or near the Decision Area. Hansen, (1986) states that three probable wolf reports have been collected from the Moyie River drainage near and adjacent to the north end of the Decision Area. In spring, 1990, howling was documented from Round Prairie. Reports of varying degrees of reliability are annually received by the district.

The Idaho Panhandle National Forests do not have any lands designated for wolf recovery. Maintenence of travel corridors with emphasis on the Coeur d'Alene and St. Joe river drainages is an objective of the Forest Plan (FP II-6).

Northern Idaho and Northwestern Montana have been identified as a dispersal corridor for movements between British Columbia and Central Idaho. Both the Kootenai and Moyie River valleys would seem to form natural travel corridors as both rivers flow across the U.S. Canadian border. However, both valleys are populated by people and livestock. Ungulates are also funneled into the river valleys in the winter. The potential for human-caused mortality would be high for any wolves following ungulates to winter ranges in the valley (Hansen, 1989).

Past and current measures utilized by the Bonners Ferry Ranger District for the conservation of the gray wolf include:

Monitoring and evaluation of reported sightings and sign.
Management of habitats for ungulate prey base through road closures, prescribed habitat burning, forage seeding, timber sale coordination.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

The proposed alternative would close newly constructed roads by barriers or gates. In addition, temporary gates would be erected during sale activities in order to preclude establishing public use patterns. New roads would be opened for a few months the year following harvest activities to allow for fuelwood gathering and closed before elk rifle

season. Bonners Ferry Ranger District has a gate monitoring program to ensure effective closures. Access management through road closures would minimize increases in motorized activity.

Forest Plan standards for wolves on the Idaho Panhandle are to consider maintenance of a high number of prey species (deer, elk) and maintenance of security through road management (FP II-28). The risk of wolf mortality would be minimized through road closures. Access management through road closures in winter range would allow dispersing wolves, if they occur, to have relatively secure access to an ungulate prey base.

Based on the previous analysis, the proposed action would have no effect on wolves or their habitat.

MEASURES FOR AVOIDING POTENTIAL ADVERSE EFFECTS

Habitat improvement projects and mitigation designed to benefit big game species would be directly benefiting the prey base of wolves. Such projects as prescribed burning on winter ranges, and forage seeding in sale areas throughout the district are planned or being implemented.

MOUNTAIN CARIBOU

IDENTIFICATION OF OCCUPIED HABITAT

Mountain caribou were historically present near the Decision Area. Flynn (1956) reported four caribou near the Moyie River between Eastport and Addie in 1954. This is the last known record of caribou from the vicinity of the Decision Area. Historic reports also came from Mission Creek, located northwest of the Decision Area and from Deer Creek to the east. All of these locations are in areas that are connected to large habitat blocks. A survey of telemetry locations of transplanted caribou dispersing from the Selkirk Ecosystem reported no locations from the Decision Area. (Compton, pers. communication).

The Decision Area is located 11 miles to the east of the caribou recovery zone in the Selkirk Mountain Ecosystem. Suitable habitat occurs in the Decision Area above 4,500 feet but the acreage is very limited, even if adjacent suitable habitat outside the Decision Area was included. It is also separated from large areas of contiguous habitat in the Purcell Mountains to the east and Canada to the north by developed valleys.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

Because the Decision Area is outside of the caribou recovery zone and habitat is very limited, the proposed action would have no effect on caribou or their habitat.

GRIZZLY BEAR

IDENTIFICATION OF OCCUPIED HABITAT

Grizzly bears were historically present in all of Boundary County. There is one recent reliable grizzly bear record from the north end of the Decision Area. Occasional grizzly sightings have occurred to the north of the Decision Area in the Mission-Harvey mountain area. The Decision Area is located approximately 2 miles west of the Keno Grizzly Bear Unit. Transient grizzly bear may occasionally use the area.

The Decision Area is located outside of areas designated for grizzly bear recovery. The Decision Area is a habitat island separated from the Keno Bear Unit by the moderately populated Moyie River valley and from the Mission/Harvey mountain area (and adjacent Canada) by Round Prairie and Highway 95.

DISCUSSION OF EFFECTS AND CUMULATIVE EFFECTS

New roads would be gated or barriered in the proposed action, and temporary gates would be erected during sale activities to preclude establishing public use patterns. New roads would be opened for a few months the year following harvest activities to allow for fuelwood gathering and closed before elk rifle season. Access management through road closures would minimize displacement and risk of mortality to transient grizzly bears, should they occur.

The Decision Area is located outside of areas designated as essential to grizzly bear recovery, therefore the proposed action would have <u>no effect</u> on the grizzly bear or its habitat.

REFERENCES AND CONSULTATIONS

References considered for this determination are listed in the EIS bibliography. Consultation with other biologists and agencies is documented in the planning files for the EIS. Biological input and review was supplied by USFS District and Forest biologists.

Sandra Jacobson

SANDRA L. JACOBSON
District Wildlife Biologist

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Bonners Ferry, ID 83805-9764
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Reply to: 2672.41

Date: March 22, 1991

Subject: West Moyie Environmental Impact Statement
Biological Evaluation of Sensitive Wildlife Species

To: District Ranger

This Biological Evaluation addresses the area identified as the Decision Area in the West Moyie Environmental Impact Statement (EIS),(U.S. Forest Service 1991). It addresses only sensitive wildlife species, with separate documents addressing threatened and endangered wildlife, sensitive plants and fish. The Decision Area is described in full in the EIS.

Alternative K, the preferred alternative, would harvest approximately 15.9 MMBF in four timber sales. It would leave about 2000 acres in an unroaded condition. Access to treat harvest units would require 8.7 miles of road construction and 8.4 miles of reconstruction.

There would be no clearcutting with this alternative. Even-aged regeneration harvesting would consist of shelterwood systems. After regeneration is established, these stands would be re-entered to remove a portion of the overstory. The final overstory removal would not occur until the stand of regeneration has grown to the point where past management activities are not noticeable (approximately 50 to 60 ft. in height).

A total of 3098 acres would be treated in 63 cutting units. Of these, 140 acres would be seed tree harvested and 273 acres would be shelterwood harvested, for a total of 413 acres of even-aged regeneration harvesting. Forty acres would be harvested using single tree selection uneven-aged regeneration systems. 777 acres would be harvested using group selection form of uneven-aged regeneration system, for an actual harvest area of 78 acres. Sanitation salvage will be implemented between the groups on 181 acres in stands where the group selection system is prescribed. 717 acres would be treated with basal area thinning to discourage mountain pine beetle infestation. 491 acres would be commercially thinned to promote growth. The overstory would be harvested on 49 acres. Sanitation salvage harvesting would be implemented on 611 acres to harvest dead, dying and high-risk timber.

Some timber would be cut in riparian areas. Timber would be removed using a salvage/sanitation system from 34,400 feet of streamside area; 800 feet using an Uneven-age management system; 2,000 feet using a Shelterwood

harvest system; and 7,400 feet using the commercial thinning harvest system.

Alternative K would provide some winter range browse for white-tailed deer. Thermal cover would be maintained. Harvest unit size would exceed the recommended 10 acres in the high risk lodgepole and white pine stands. Stands that currently provide high value winter range cover would be managed with uneven-aged prescriptions designed to maintain cover within the stand. Timing of logging operations would be managed to reduce disturbance to deer.

SENSITIVE SPECIES

Sensitive wildlife species are determined by the Regional Forester and are those species for which population viability is a concern. Sensitive species analysed in this document are Coeur d'Alene Salamander (*Plethodon idahoensis*), Common Loon (*Gavia immer*), Harlequin Duck (*Histrionicus histrionicus*), Boreal Owl (*Aegolius funereus*), Townsend's Big-eared Bat (*Plecotus townsendii*), Wolverine (*Gulo gulo*).

COEUR D'ALENE SALAMANDER

IDENTIFICATION OF OCCUPIED HABITAT

One population of the Coeur d'Alene salamander has been discovered at Copper Falls, northeast of the Decision Area. Coeur d'Alene salamanders have been located in the Decision Area at Little Hellroaring Falls (B.Christensen 1989). Other possible sites in the Decision Area were surveyed and no salamanders found.

The Little Hellroaring Falls population inhabits the spray zone at the base of the first waterfall. Additional habitat is present above the falls where a talus slope enters the creek. Maintaining watershed quality relative to water temperature, moisture, and a constant microenvironment is necessary for salamander population stability.

Past efforts by the Bonners Ferry Ranger District for the management and conservation of the Coeur d'Alene salamander include:

Funded surveys with Idaho Natural Heritage Program 1989.
Protection of known populations.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

The indicators for Coeur d'Alene salamander are: a) maintenance of water yield stability, b) maintenance of water temperature, and c) maintenance of existing cover directly shading the site. In Alternative K, there would be no change in thermal stability of Coeur d'Alene salamander microhabitat. No overstory removal would take place along streamside habitat or upstream from critical microhabitat. This ensures a stable microenvironment and constant water temperature along existing salamander habitat. Water yield stability would be maintained.

Based on the previous analysis, the project would have no effect on the Coeur d'Alene salamander.

MEASURES FOR AVOIDING POTENTIAL ADVERSE EFFECTS

Coeur d'Alene salamander habitat would be protected by maintaining water yield stability and water temperature of Little Hellroaring Creek. There would be no overstory removal along Little Hellroaring Creek or in adjacent drainages suitable for Coeur d'Alene salamander habitat.

COMMON LOON

IDENTIFICATION OF OCCUPIED HABITAT

Lakes 10 acres or larger are suitable breeding habitat for loons. Bussard, Sinclair and another unnamed lake by Good Grief are all less than 8 acres. There are no loon sightings from these lakes. Loons are seen annually on nearby Robinson Lake, including a pair in May, 1989 which appeared to be prospecting for a nest site.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

Based on the lack of suitable breeding habitat, alternative K would have no effect on common loons.

HARLEQUIN DUCK

IDENTIFICATION OF OCCUPIED HABITAT

Harlequin ducks are presumed to be present in the Decision Area. Surveys were done in 1989 and 1990, with two separate sightings along the Moyie in 1990.

Harlequins require undisturbed areas for nesting and rearing young. Activities affecting streamside vegetation in nesting areas may cause declines in productivity of harlequins. Affecting stream sedimentation will in turn affect aquatic invertebrates and will have long term effects on productivity (Wallen and Groves 1988). High recreational activity along the Moyie River may preclude breeding of harlequins in the area. Harlequins may tolerate some traffic if there is abundant shrub and tree cover, however, water sports such as fishing and rafting may have greater impacts.

Past efforts by the Bonners Ferry Ranger District for the management and conservation of the harlequin duck include:

Funded surveys with Idaho Natural Heritage Program in 1989 and 1990.
Monitoring of reported sightings.
Cooperative interagency educational/information exchange with INHP.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

In Alternative K, a strip of riparian vegetation would be left along Unit 37 to provide cover along the river. This project will have no effect on the harlequin duck.

MEASURES FOR AVOIDING POTENTIAL ADVERSE EFFECTS

If harlequin ducks were found to breed in the area, a management plan would be developed if needed to protect the population.

BOREAL OWL

IDENTIFICATION OF OCCUPIED HABITAT

Boreal owls inhabit the spruce fir and upper cedar hemlock zone in northern Idaho. Suitable breeding habitat exists within the Decision Area in the form of mature and old growth spruce fir stands. Two boreal owls were determined to be present in the Decision Area based on a survey in March 1991, but it is unknown if successful breeding has occurred in the Decision Area.

For the purpose of the analysis, land above 5,000 feet is assumed to be occupied by boreal owls (USDA, 1989). Boreal owls nest in stands of mature to old growth timber. These later seral stages provide prey species and have structural components, such as snags greater than 15" dbh, suitable for nesting. Boreal owls will utilize younger stands as small as immature sawtimber as foraging habitat.

The area analyzed for boreal owl habitat encompasses the entire habitat island of spruce fir which occurs around the Queen/Bussard/Tungsten Mountain complex. This area is approximately 6,600 acres of which 5,200 acres are classified as potential boreal owl habitat.

Alternatives were analyzed using two components of owl habitat, nesting and foraging habitat. Tentative recommendations to maintain a self-replacing population on a habitat island such as the Decision area are to maintain 30% or more of the area above 5,000 feet in mature to old growth stands for nesting habitat, and 50% or more of the area in immature sawtimber and older size classes for foraging habitat (Hayward, personal communication). Threshold levels are estimations for an unmanaged situation and should be applied with caution in a managed situation. The 30% level for nesting habitat and 50% level for foraging habitat will be used as thresholds for analysis of habitat quality.

Currently there is 25.1% potential nesting habitat and 56.7% feeding habitat in the Decision Area. The existing condition of the Decision Area does not meet recommendations for nesting habitat, but exceeds recommendations for foraging habitat. It is likely that owls present are dispersing from other populations and not self-replacing.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

This alternative maintains nesting and foraging habitat at existing levels. Harvesting planned for stands within the potential owl habitat zone includes basal area thinning and the group selection form of uneven-aged management. The thinning would be applied to some stands that now provide foraging habitat, and would not noticeably alter the suitability of these stands for foraging. Group selection would be prescribed in two potential nesting stands, Units 53 and 56. There would be no effect on nesting habitat potential for these stands at the level prescribed, provided the stands have a very long rotation to allow the residual trees to maintain their old growth or mature character. This is estimated to be 250 years (Hayward, personal comm. 1991). Salvaging in nesting and foraging habitat will have a minimal effect if snag management guidelines, with an emphasis on maintaining large diameter snags, are followed. (Snag marking guidelines will be followed).

Boreal owls are secondary cavity nesters and require populations of primary excavators (pileated woodpecker and common flicker) to supply nest sites. Reductions in pileated woodpecker nesting habitat in the ecotone between cedar-hemlock and spruce-fir may reduce the availability of cavities for boreal owl nest sites.

The area necessary to support a population is unknown but likely exceeds 1000 square kilometers (386 square miles)(Hayward, 1989b). Dispersal of quality foraging and nesting habitat over the landscape is important. The number and size of suitable habitat islands necessary to maintain a population is currently unknown. The cumulative effects of many timber sales over a large area on boreal owl habitat is unknown.

Based on the previous analysis, the project is <u>not likely to have an adverse effect</u> on the boreal owl.

MEASURES FOR AVOIDING POTENTIAL ADVERSE EFFECTS

Boreal owls are currently being sporadically monitored on the Idaho Panhandle National Forests, with monitoring levels dependent on funding. Although detecting a decline or increase in the population of an uncommon species such as the boreal owl is very difficult, should monitoring indicate a decline, further measures for the maintenance of this species will be initiated.

TOWNSEND'S BIG EARED BAT

IDENTIFICATION OF OCCUPIED HABITAT

There are no known locations of Townsend's big-eared bats in the Decision Area. The area around Sinclair Lake was surveyed for bats during the summer of 1989 by Deering (report pending).

Townsends big-eared bats have been found in a wide variety of habitats, from arid juniper/pine forests to high elevation mixed-coniferous forests

(USDA 1989). Hibernacula (winter roost sites) and nursery colonies generally occur in caves and abandoned mine shafts. The only known possible roost sites occur around Tilly Mine, in abandoned mine shafts. These sites have not been investigated to date.

Past and present efforts by the Bonners Ferry Ranger District for the management and conservation of Townsend's big-eared bat include:

Survey for presence by a recognized bat expert in 1989.
Bat houses to encourage colonization of bats were installed at two lakes in the vicinity of the Decision Area.
Educational activities to encourage public appreciation for bats.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

The indicator for Townsend's big-eared bat is disturbance of possible roost sites through management activities. The possible roost sites in mine adits at the Tilly Mine site will be protected for historic reasons, which will also protect Townsend's big-eared bats if they occur there. This project will have <u>no effect</u> on the Townsend's big-eared bat.

MEASURES FOR AVOIDING POTENTIAL ADVERSE EFFECTS

If a new population is discovered within an area in which management activities are planned or occurring, a biological evaluation will be written which would analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole (FSM 2670.42). If deemed necessary, a management plan would be developed to avoid or minimize impacts to the local population.

WOLVERINE

IDENTIFICATION OF OCCUPIED HABITAT

Wolverine use of the Decision Area is probably limited to transitory animals which maintain home ranges in either the Selkirk or the Purcell Mountains (H.Hash pers. comm. and P. Hanna pers. comm.). Although there are no documented wolverine sightings within the Decision Area, three sightings have occurred within five miles.

Wolverines occupy large areas of undisturbed habitat such as wilderness and roadless areas (H. Hash pers. comm.). Due to their dependence on carrion, wolverines maintain large home ranges averaging more than 154 square miles (C. Groves 1987). The Decision Area is approximately 33 square miles and is much too small to support resident wolverine, however, it may be used seasonally by residents from adjacent populations or by transients.

In areas where trapping occurs, maintaining security habitat is very important for wolverine. Because of its curious nature and dependence on carrion, the wolverine is frequently trapped, and often escapes injured (H. Hash pers. comm.).

Past efforts by the Bonners Ferry Ranger District for the management and conservation of the wolverine include:

Monitoring of reported wolverine sightings.
Public education/school programs on TES species.
Access management for this and other wildlife species.

ANALYSIS OF EFFECTS AND CUMULATIVE EFFECTS

To provide wolverine security habitat, for both disturbance and risk of mortality from increased trapping accessibility or illegal shooting, alternative K would include year round closure of newly constructed roads. This project will have no effect on the wolverine.

MEASURES FOR AVOIDING POTENTIAL ADVERSE EFFECTS

Population numbers are probably most influenced by trapping regulations and related management programs. Should potential concerns for the existing or future welfare of the wolverine population increase, agencies would need to develop cooperative management plans to ensure the continued maintenance of habitats and populations.

REFERENCES AND CONSULTATIONS

References considered for this determination are listed in the EIS bibliography. Consultation with other biologists and agencies is documented in the planning files for the EIS. Biological input and review was supplied by USFS District and Forest biologists.

Sandra L. Jacobson

SANDRA L. JACOBSON
District Wildlife Biologist

IDAHO FISH & GAME
600 South Walnut / Box 25
Boise, Idaho 83707

JUL 27 1989

July 24, 1989

Mr. Charles Prausa, District Ranger
Bonners Ferry Ranger District
Route 4, Box 4860
Bonners Ferry ID 83805

Dear Mr. Prausa:

As requested in your letter of 7 July, enclosed is a draft copy of the state's new definition and list of Species of Special Concern. This list will be final pending approval of the Commission who will consider it at their August meeting.

In relation to the Moyie and Boulder-Katka EIS areas, I'd like to make a couple suggestions concerning Forest Service Sensitive Species. As you are probably aware, I've been trying to determine the status of harlequin ducks in northern Idaho during the last three years. I have not had time to intensively survey Boulder Creek or the Moyie River for harlequins. You may want to get this done as part of the EIS process. In addition, wolverines and Townsend's big-eared bats (2 other Sensitive Species) may also occur in the project area. I have proposed wolverine surveys through the Challenge Cost Share program for next fiscal year on the Panhandle NF. I noted several old mines in both project areas which may contain bat populations and should be surveyed for Sensitive Species. On the enclosed Species of Special Concern list I have hi-lited other species which might be in the project area.

Sincerely,

Craig Groves

Craig Groves
Staff Nongame Biologist

Current definition of Species of Special Concern: Species with restricted ranges, specific habitat requirements, or low numbers which make them vulnerable to elimination from the state.

Current list of Species of Special Concern:

Coeur d'Alene Salamander	Long-billed Curlew
Wood Frog	Trumpeter Swan
Roughskin Newt	Boreal Owl
Night Snake	Merlin
Western Ground Snake	Ferruginous Hawk
Longnose Snake	Idaho Ground Squirrel
Ringneck Snake	Fisher
Bobwhite Quail	Lynx
Mountain Quail	Wolverine
Sharp-tailed Grouse	Kit Fox

Proposed new definition: Native species which are either low in numbers, limited in distribution, or have suffered significant habitat losses. The list includes three categories of species: A) species which meet one or more of the criteria above and for which Idaho presently contains or formerly constituted a significant portion of their range (i.e. priority species), B) species which meet one or more of the criteria above but whose populations in Idaho are on the edge of a breeding range that falls largely outside the state (i.e. peripheral species), and C) species that may be rare in the state but for which there is little information on their population status, distribution, and/or habitat requirements (i.e. undetermined status species).

PROPOSED DELETIONS FROM THE LIST AND EXPLANATIONS:

Roughskin Newt: The best available information on this species indicates it was probably introduced to Idaho. The proposed deletion from the list is because it is not the purpose of the Nongame Program to conserve non-native fauna.

Bobwhite Quail: This species was introduced to the state for hunting purposes. An explanation for its proposed deletion from the list is provided above.

Long-billed Curlew: Information compiled by the BLM indicates that this species is widely distributed on southern Idaho rangelands. Although data on population trends do not exist, populations do not appear to be declining. It is proposed that this species be deleted from the list.

Sharp-tailed Grouse: Populations in SE Idaho have been increasing or stable in last few years. It is proposed that this species be deleted from the list.

Night Snake: More abundant than previously thought. Recommendation is to de-list.

PROPOSED ADDITIONS TO THE SPECIES OF SPECIAL CONCERN LIST

CATEGORY A (Priority Species):

Coeur d'Alene salamander, trumpeter swan, ferruginous hawk, mountain quail, boreal owl, Idaho ground squirrel, fisher, wolverine. These species are on the current Species of Special Concern list. They would be placed in Category A of the new list.

1. Common Loon: A 1985 status survey of this species indicated that the loon no longer nests in Idaho. Human disturbance on lakes containing suitable habitat appears to be the primary cause of the lack of nesting.

2. American White Pelican: Considered a sensitive species throughout its range in the West, this species once nested at Blackfoot Reservoir and Minidoka NWR. It is easily disturbed during the nesting season.

3. Harlequin Duck: A 1987-1988 status survey of this species in northern Idaho indicated that it is a rare breeder in the state. Its habitat requirements are specific - low gradient, pristine mountain streams with well-developed riparian habitat and little to no human activity.

4. Upland Sandpiper: An uncommon breeder in Idaho that formerly nested at Rathdrum Prairie in northern Idaho and probably in Long Valley. The only current nesting locales for the species are privately owned meadows in High Valley, Round Valley, near McCall, and along the Idaho border near Spokane.

CATEGORY B (Peripheral Species):

Wood frog, longnose snake, western ground snake, merlin, kit fox, lynx. These species are on the existing Species of Special Concern list. They would be placed in Category B of the new list.

Mojave black-collared lizard, great egret, yellow-billed cuckoo, coast mole, cliff chipmunk, Uinta chipmunk, rock squirrel, dark kangaroo mouse, little pocket mouse, northern bog lemming: These species would be added to Category B because they are rare in Idaho, but relatively common elsewhere. Note: Because of the unpredictable nature and large number of rare nesting birds, we have decided to only list those birds here which are rare nesters, consistently nest in the same locale, and their habitat is rare or declining in the state (e.g. riparian habitat).

CATEGORY C (Undetermined Status Species):

Western pond turtle, northern alligator lizard, ringneck snake, smooth green snake, black-billed cuckoo, flammulated owl, great gray owl, barred owl, northern pygmy-owl, white-headed woodpecker, three-toed woodpecker, pygmy nuthatch, Preble's shrew, pygmy shrew, spotted bat, Townsend's big-eared bat, fringed myotis, California myotis, western pipistrelle: These species would be added to Category C because we suspect that they are uncommn in Idaho, but we have little information on their population status, distribution, and/or habitat requirements.

RECOMMENDED LIST OF SPECIES OF SPECIAL CONCERN

CATEGORY A (Priority Species) (12 species)

Coeur d'Alene salamander
Common Loon
American White Pelican
Trumpeter Swan
Harlequin Duck
Ferruginous Hawk
Mountain Quail
Upland Sandpiper
Boreal Owl
Idaho ground squirrel
fisher
wolverine

CATEGORY B (Peripheral Species) (16 species)

Wood frog
Mojave black-collared lizard
longnose snake
western ground snake
Great Egret
Merlin
Yellow-billed Cuckoo
coast mole
cliff chipmunk
Uinta chipmunk
rock squirrel
dark kangaroo mouse
little pocket mouse
northern bog lemming
kit fox
lynx

CATEGORY C (Undetermined Status Species) (19 species)

western pond turtle
northern alligator lizard
ringneck snake
smooth green snake
Black-billed Cuckoo
Flammulated Owl
Great Gray Owl
Barred Owl
Northern Pygmy-owl
Three-toed Woodpecker
White-headed Woodpecker
Pygmy Nuthatch
Preble's shrew
pygmy shrew
spotted bat
Townsend's big-eared bat
fringed myotis
California myotis
western pipistrelle

United States Department of the Interior

FISH AND WILDLIFE SERVICE

BOISE FIELD OFFICE
4696 Overland Road, Room 576
Boise, Idaho 83705

May 24, 1989

Paul R. Sieracki, Biological Technician
Bonners Ferry Ranger District
Route 4, Box 4860
Bonners Ferry, Idaho 83805

Re: 1-4-89-SP-205

Dear Mr. Sieracki:

We have reviewed your letter dated April 24, 1989, concerning the West Moyie, East Moyie, Katka and Boulder timber sale analysis areas in Boundary County, Idaho. Enclosed is a list of endangered, threatened and candidate species that may occur in this area (Enclosure A).

Enclosure B lists the continuing responsibilities as described in Section 7(a) and (c) of the Endangered Species Act (ESA). If there are any questions regarding your responsibilities under the ESA, Richard Howard of this office may be contacted at 334-1931. However, pursuant to regulations under Section 7, the National Park Service should renew its species list request after 180 days past this response.

Candidate species are included for your information. These species are presently being reviewed by this Service for consideration of listing as threatened or endangered. It should be noted that candidate species could be formally proposed and be listed during your project period, thereby, falling within the scope of Section 7 of the Endangered Species Act. Informal consultation with this office should be considered if this project is likely to impact a candidate species.

Additional information on Federally listed and candidate species and State species of special concern is available through the Idaho Natural Heritage Program, Attn: Craig Groves, Program Coordinator, Idaho Department of Fish and Game, 600 S. Walnut, P.O. Box 25, Boise, Idaho 83707, phone 334-3402.

Your interest in endangered species is appreciated.

Sincerely yours,

Charles H. Lobdell
Field Supervisor

Enclosures
cc: FWS, AFWE-SE, Portland
IDFG, Hdqtrs., Boise
IDFG, Region 1, Coeur d'Alene

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, AND CANDIDATE SPECIES, THAT MAY OCCUR IN THE TIMBER SALE ANALYSIS AREAS IN BOUNDARY COUNTY, IDAHO
FWS-1-4-89-SP-205

LISTED SPECIES	COMMENTS
Gray Wolf (*Canis lupus*)	East Moyie (probable) West Moyie (probable) Katka (probable)
Grizzly Bear (*Ursus arctos horribilis*)	Boulder Katka
Bald Eagle (*Haliaeetus leucocephalus*)	Katka

PROPOSED SPECIES

None

CANDIDATE SPECIES

Coeur d'Alene Salamander (*Plethodon idahoensis*) (3C)	East Moyie
Wolverine (*Gulo gulo*) (C2)	East Moyie

FEDERAL AGENCIES' RESPONSIBILITY UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) - Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species; or result in destruction or adverse modification of critical habitat; and

3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) - Biological Assessment for Major Construction Activities 1/

Requires Federal agencies or their designees to prepare Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action on listed and proposed species. The process begins with a Federal agency in requesting from FWS a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the list species should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may be taken; however, no construction may begin.

We recommend the following for inclusion in the BA; an onsite inspection of the area to be affected by the proposal which may include a detailed survey of the area to determine if the species are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

1/ A major construction activity is a construction project (or other undertaking having similar physical impacts) which is a major action significantly affecting the quality of human environment as referred to in the NEPA (42 U.S.C. 4332 (2)(c).

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Boise Field Station
4696 Overland Road, Room 576
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RECD BFRD

APR 1 1991

AS REQUESTED
LISTED AND PROPOSED ENDANGERED
AND THREATENED SPECIES, AND CANDIDATE
SPECIES, THAT OCCUR WITHIN THE BONNERS FERRY RANGER DISTRICT

DATE: March 27, 1991
PROJECT NAME: West Moyie Final Environmental Impact Statement
SPECIES LIST NO. FWS 1-4-91-SP-364 (SE# 6003.2590)

LISTED SPECIES	COMMENTS
Gray Wolf (*Canis lupus*)	

PROPOSED SPECIES

None

CANDIDATE SPECIES

Wolverine
(*Gulo gulo luscus*)

GENERAL COMMENTS:

Above species updated from May 10, 1989 species list #1-4-89-SP-205.

Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Boise Field Station
4696 Overland Road, Room 576
Boise, Idaho 83705

REC'D BFRD

APR 4 1991

March 28, 1991

William E. Morden
Forest Supervisor
Idaho Panhandle National Forest
1201 Ironwood Drive
Coeur d'Alene, Idaho 83814

Re: West Moyie Timber Sale
1-4-91-10-I
SE# 6003.2590

Dear Mr. Morden:

We are writing in response to your request for consultation on the draft biological assessment for the West Moyie Timber Sale proposal. We agree with your assessment of no adverse impact to endangered species.

Thank you for the opportunity to comment.

Sincerely,

Charles H. Lobdell
Field Supervisor

cc: IDFG, Region 1, Coeur d'Alene

IDAHO PANHANDLE NATIONAL FOREST

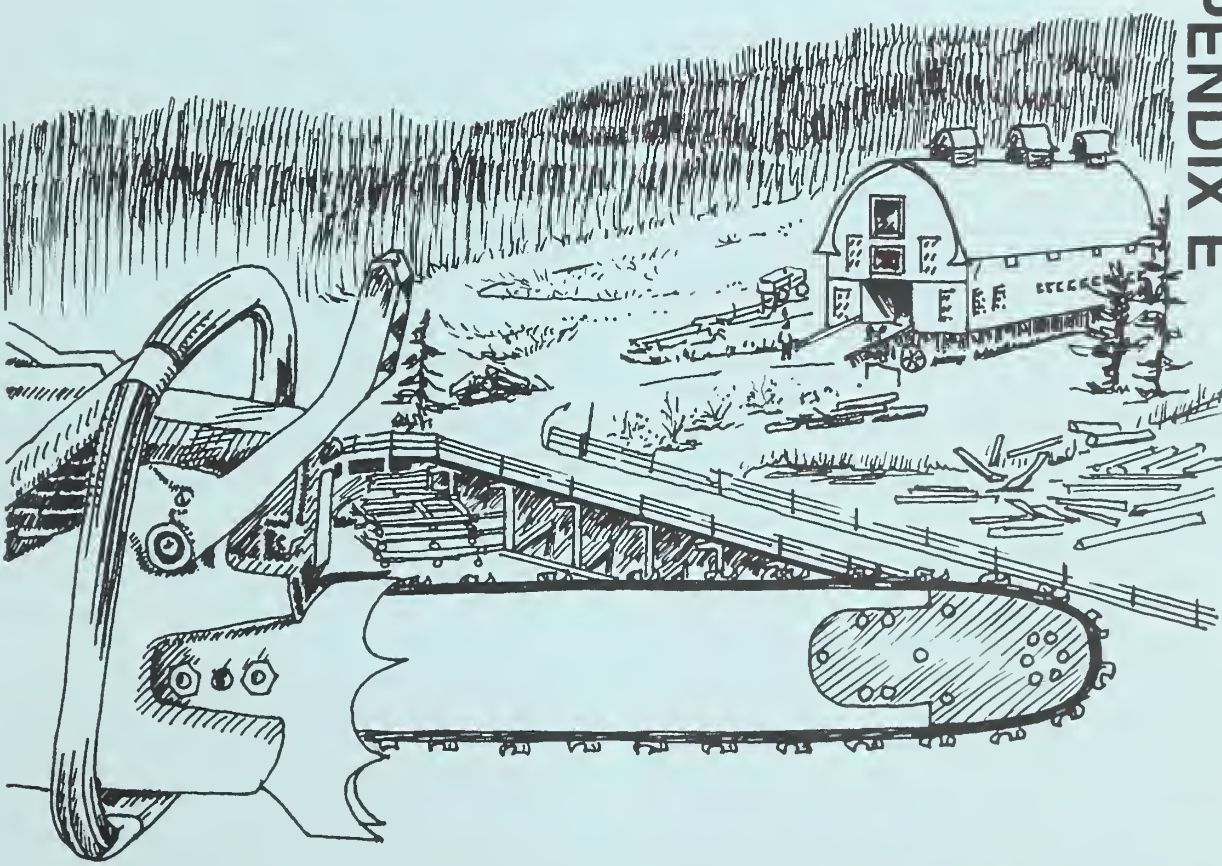
X=ACTION	✓=INFO
FS	BLM
PAS	Recreation
DEPUTY	LA
Secy	R&W
	Land Exc
ADM	Minerals
Law	AFM-WL-F
4-1 Firs	Fuels
Per	Fisheries
Adm. Svc	Wildlife
S&F	Aviation
Ins	Disp.

APR - 1 1991

T-WS	FOREST ENGR
Sale Adm	Programs
Logging	Tr. Svs
Silvic	Facil
Watershed	Fleet
	Planning
	Team Leader
	Env Coord
	Timber Plnr

COPIES TO:
ALL RANGER DISTRICTS
NURSERY
ZONE ENGINEERING
ZONE ENGINEERING

APPENDIX E



Bonners Ferry Lumber Company horse and hay barn, circa 1905, was located west of the town of Bonners Ferry on the south bank of the Kootenai River.

Changes from Draft to Final EIS

Three respondents to the Draft EIS had comments concerning the Economic Appendix. Two of the respondents asked for a more comprehensive economic analysis that included costs and benefits other than those directly related to the harvest of timber at the project level. While these comments question the level of analysis appropriate at the project level, they are best addressed as two separate issues.

One issue, the comprehensive economic analysis, deals with the depth of analysis performed at the project level relative to the scope of the project and complexity of the decision. The other issue deals with the role of project level analysis in the decision making process.

Dealing with the second issue, the role of economic analysis in the decision making process, the Forest Service has held that economic analysis at the project level serves to provide the decision maker with a relative comparison of alternatives from which to make a reasoned choice. This economic analysis is not conducted to revisit decisions (Management Area allocation) made at the Forest Plan level. It is inappropriate to attempt to reassess land allocation decisions based on economic factors at the project level (i.e. Timber Production Management Area vs. Roadless Management Area).

This position has been affirmed through numerous appeal decisions. The Secretary of Agriculture in a February 25, 1987 decision on the Sandbench appeal states that the full range of non-timber costs and priced benefits (as used in the Forest Plan to help designate Management Areas) is appropriate at the timber program (Forest Plan) level, and not at the individual project level (MacCleery, 1987).

The depth of analysis at the project level, is at the heart of the issue of developing a comprehensive economic analysis which includes costs and benefits other than those directly related to the timber harvest, i.e. roadless/wilderness, wildlife, and recreation values. It is the Forest Service Position that this level of analysis is appropriate at the Forest Plan level, and goes beyond the scope of this analysis.

A comprehensive economic analysis is conducted at the Forest Plan level when many projects over a large area are consolidated, and differences can be detected. This is a basic principle behind the Forest Service two-level decision process where the allocation of lands to management practices (i.e., defining the Management Areas) is made in the Forest Plan, and the selection of actions to achieve the objectives of the Forest Plan are made at the project level. This postion has been affirmed in numerous appeal decisions.

The Secretary of Agriculture's decision on the Sandbench appeal affirmed that it was "simply not efficient to attempt to identify all of the forest level information every time an individual project is proposed". Decisions by the Regional Forester on appeals of the Drystone, Smith Flats, and Lairdon Gulch Timber Sales, all affirm that the appropriate level of analysis at the project level "centered the economic analysis on those costs and benefits directly associated with timber harvest and road construction" (see Project File).

The Ninth Circuit Court of Appeals in the 1982 ruling on Rare II (California vs Block) found that it was not necessary to weigh the economic benefit attributable to development in each roadless area against the economic loss of wilderness values each area would suffer from development. The court cited Trout Unlimited vs. Morton (7ERC 1327) which found a formal cost benefit analysis unnecessary. Furthermore, 40 CFR 1502.23 states that "the weighing of the merits and draw backs of the various alternatives need not be displayed in a monetary cost benefit analysis and should not be when there are important qualitative considerations".

Dealing with comprehensive economic analysis at the project level is not only inappropriate but non-essential to the decision to be made. Secondarily, an analysis of this type at the project level would suffer from a lack of information. It is not the lack of reliable dollar values assigned to non-market uses such as hunting, fishing, or dispersed recreation that limit analysis, rather it is what economists call the production function information. This simply means that at the project level changes in non-market uses resulting from management differences between alternatives are almost impossible to predict or detect. To be sure, subtle changes in these non-market uses will occur with various alternatives, but the technol-

ogy to quantify these changes on such a scale is not available.

One respondent requested that we disclose the total value of the timber within the Hellroaring Roadless area. The total volume of timber within the Decision Area, and that portion that is within the roadless area, is disclosed on page 3-69. To provide the total value of this timber would require the development of a plan to harvest all suitable timber within the roadless area. An economic analysis could then be conducted on the sales and the values discounted to present net value. This information is not necessary for the decision to be made. In addition this approach is not realistic beyond a twenty year planning period for the following reasons:

1. *The value of timber harvested over two decades from now would have little effect on the PNV.*
2. *It would be impossible to develop this harvest schedule with a meaningful degree of accuracy. In all probability the objectives and standards for natural resource management would change several times prior to completion of the harvest schedule. In addition natural forces which could not be accounted for, would undoubtedly influence future management activities.*

One respondent requested that we show the economic analysis of alternatives as related to entering the roadless area, or what portion of the Present Net Value is related to harvesting timber in the roadless area. This information is now shown in Table E-1, (page E-3) identifying the costs and revenues of each alternative. The present net value is now identified for the roadless portion of the alternative as well as the total for the project.

PURPOSE

The economic effects analysis was conducted primarily to provide a reliable means to contrast the relative costs and revenues of the proposed alternatives. The analysis was not intended to provide an estimation of the costs and revenues reported in the annual Timber Sale Program Information and Reporting System (TSPIRS) report. Rather, it provides the decision maker the assurance that economic efficiency was considered in the design of each alternative and the discretion to use monetary cost/revenue information in the decision process.

INTRODUCTION

This section explores the economic consequences of implementing the alternatives described in Chapter 2. Each alternative produces a different level of revenues and costs flowing from timber harvest and road construction activities, and the analysis focuses on the relative differences in these amounts between alternatives. Present net value analysis was used to display the difference in financial performance of the various alternatives.

The project level analysis compares only the costs and revenues of market resources such as timber. Such an analysis is actually a financial analysis of dollar transactions associated with the market resources rather than the more comprehensive cost efficiency analysis completed at the Forest Plan level. (At the Forest Plan level the costs and benefits of both market and non-market resources are compared and contrasted in making land allocation decisions).

The following table shows a summary of discounted costs and revenues for the project period. A detailed listing of revenues and costs by alternative, along with proposed time schedules is part of the project files on record. Revenue and cost data were developed specifically for this project and reflect current levels for this geographic area.

- The cost of planning was actual and expected costs of preparation of the DEIS and FEIS; it has been updated between the Draft and Final EIS. Since the driving reason for preparing an EIS was entry into the roadless area, the majority of the cost of this planning was charged against the value of the roadless timber. That portion charged against the roaded timber represents our cost estimate for preparing an Environmental Assessment for similar roaded area timber harvest.

- The costs of road construction were engineering estimates made in conjunction with the transportation analysis conducted on the area. The total cost of road construction and reconstruction are counted as costs against

this timber entry, they were not amortized over any period of time.

- Other timber sale related costs were based on the experienced historical costs from the Bonners Ferry Ranger District.

- Stumpage values were projected for each alternative using the Transaction Evidence appraisal system. This appraisal system utilizes collected bid data from previously sold timber sales within Region One. Region One covers Montana, portions of North Idaho and North Dakota. The predicted high bids from the appraisal system were adjusted to reflect the actual overbid factor from FY 1990 timber sales on the Bonners Ferry Ranger District. The values used in the DEIS were updated to reflect the decline in the lumber market. However, since the Transaction Evidence appraisal system is based on past bidding history, it may over estimate the value of the timber during declining markets and underestimate the timber value during rising markets.

TABLE E-1

SUMMARY OF DISCOUNTED COSTS AND REVENUES FOR THE PROJECT PERIOD

	B2	D	E	H	I	J1	J2	J2H	EH	K
Volume (MMBF)	21.1	7.9	5.8	11.8	7.2	11.2	12.9	19.3	15.7	15.9
PV COSTS $1000's										
EIS Development	323.8	323.8	323.8	323.8	323.8	323.8	323.8	323.8	323.8	323.8
Sale Layout	90.0	33.6	24.8	50.5	30.9	47.9	54.9	94.3	82.9	77.4
Road Const.	409.6	213.6	80.0	261.2	169.8	191.5	239.9	239.9	81.4	211.6
Sale Admin.	65.1	24.3	17.7	36.6	22.4	34.5	39.7	77.6	71.5	63.2
Brush Disposal	254.3	24.7	38.8	131.2	87.8	108.3	144.5	167.1	63.1	94.7
Erosion Control	3.7	4.2	1.9	9.4	5.9	9.3	10.6	11.2	7.7	5.0
Plant & Survey	276.6	0.8	17.0	68.2	56.2	30.5	53.0	53.8	25.6	32.7
Close Roads	4.9	2.4	0	2.7	3.6	0.6	0.7	0.7	0	3.0
Stand Exams	4.3	8.0	3.4	4.5	3.0	4.3	4.6	9.5	9.1	9.8
Precom. Thin	7.0	7.0	7.0	7.0	0	14.0	14.0	14.0	14.0	4.7
KV Other	89.8	76.8	58.5	76.4	72.0	91.2	94.5	105.6	84.5	141.3
Total PV Cost	1529.1	719.1	573.0	971.7	775.7	855.9	980.3	1097.6	763.7	967.1
Total PV Rev	2367.0	919.0	665.2	1394.4	773.1	1347.7	1550.7	1563.4	851.9	1319.3
Total PNV	837.9	200.0	92.3	422.7	-2.5	491.8	570.4	465.8	88.2	352.1
Rev/Cost Ratio	1.55	1.28	1.16	1.44	1.00	1.57	1.58	1.42	1.12	1.36
Roadless PNV										
Helicopter harvest	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-247	-308	-213
Conventional harvest	116	-132	N/A	-36	-137	14	78	220	43	138

Summary of Local Socio/Economic Conditions

The impacts of Idaho Panhandle National Forests (IPNF) management activities on the local economic community were evaluated during the development of the Forest Plan. The Forest Plan FEIS contains a description of the social and economic conditions of Boundary County (pages II-111 to II-112, III-6 to III-10, and III-31).

In addition to the Forest Plan EIS, the Idaho Panhandle National Forest (IPNF) conducted a detailed study on the effects of timber supply on the economy of Boundary County (IPNF, 1987). The Implan Version II Model was used to predict total employment, income, and number of jobs.

Other factors considered during the Forest Planning procedure were payments made to counties though National Forest Funds and Payments in Lieu of Taxes. The procedure and results of these assessments are contained in Appendix 20 of the IPNF Forest Plan.

Although activities within the West Moyie Decision Area contribute to local socioeconomic impacts, it is the Forest Service position that these impacts can not be effectively analyzed at the project level. A comprehensive economic analysis is conducted at the Forest Plan level when many projects over a large area are consolidated, and differences can be detected.

The Secretary of Agriculture's decision on the Sandbench appeal affirmed that it was "simply not efficient to attempt to identify all of the forest level information every time an individual project is proposed" (MacCleery, 1987). Below are a few of the problems encountered when Forest Plan level economic impact indicators are applied to the project level of planning.

Employment and Income

Input-output analysis completed for the Forest Plan indicates employment and income are directly related to the supply of timber ultimately available to local mills. The effect of any one of the West Moyie harvest alternatives on this supply is difficult to predict due to the opportunities available to substitute timber from other sources.

Each timber harvest alternative would provide a certain quantity of stumpage to the local marketplace, but the IPNF total sustainable timber sale program has greater influence on stable employment and income levels than these individual projects. Individual projects like the West Moyie timber sales contribute to the allowable sale quantity (ASQ) projected in the Forest Plan and effects have been presented in the FEIS for the Forest Plan (pages II-105 to II-160).

Payments to Counties

Payments made to counties come from a combination of two sources; the National Forest Fund (NFF) and Payments in Lieu of Taxes (PILT). NFF payments to the counties are based on revenues received during the year by the entire Kaniksu National Forest. These funds are then proportioned to the counties based on the acres of National Forest in each county. These revenues for the most part (98%) are the result of the actual quantity of timber cut and the value at which this timber was sold.

National trends heavily influence these factors and are difficult to predict. In addition, local timber supply levels also influence local stumpage price values. If demand for timber remains constant, reduced timber supplies would increase stumpage values. In part, these increased values would compensate for the lost revenues resulting from reduced harvest volumes. If supplies increase the reverse is true.

Payments in Lieu of Taxes (PILT) are designed to supplement other Federal land revenue sharing payments made to local governments. These payments are based on the amount of Federal land in the county and are limited by the population of the county and other Federal payments made to the county in the previous year. Because PILT payments are limited by other previously made Federal payments which are difficult to predict, the PILT payments also become difficult to predict. West Moyie timber sales may not influence PILT payments since recent NFF payments to counties have been well above the level that would trigger increases in PILT payments.

*GPO-593-547-6/91